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OBSERVATIONS ON BIRDS OF THE SOUTH ATLANTIC.

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Plates XXXV–XXXIX.

DURING 1912–1913 the writer made a voyage in the New Bedford whaling brig *Daisy* for the purpose of conducting field work at the island of South Georgia. The birds collected on the expedition number upwards of five hundred specimens, which are the property of the Brooklyn Museum and the American Museum of Natural History. The task of working up this collection is one which will require considerable time owing to the present dearth of material for comparison, and pending reports on the taxonomy and life histories of the South Georgia birds it has been thought advisable to publish an account in narrative form of the species observed at sea between the Equator and the subantarctic island which was the objective point of the expedition.

The *Daisy* crossed the Line in longitude 28° W., on October 14, 1912. October 16 was spent ashore at the island of Fernando Noronha, which was the last land sighted until November 23, when we arrived at South Georgia in latitude 55° S.

October 17, lat. 5° 21′ S., long. 32° 44′ W. Strong southerly winds. A small flock of 'Mother Carey's Chickens' *Oceanites oceanicus* (also observed in the North Atlantic) followed us in a rather desultory fashion. They did not approach near to the stern of the brig. These birds seem to gain confidence with numbers, for when large flocks follow they usually fly very close.

October 18, lat. 7° 07′ S., long. 33° 04′ W. Many of *Oceanites oceanicus* and a single *Fregetta grallaria* followed all day.

October 20, lat. 10° 21′ S., long. 34° 04′ W. Many of *Oceanites oceanicus* followed, their numbers increasing up to the middle of the afternoon, when they dwindled off again. Three jaegers (*Stercorarius parasiticus*) were noted. A pair of them tagged after us, dropping repeatedly into the water and then rising again to pursue the brig, from nine o'clock in the morning until four in the afternoon.

October 21, lat. 12° 15′ S., long. 33° 55′ W. Wind veering to eastward, strong. With a rougher sea more of *Oceanites oceanicus* followed; also they flew closer to the ship.

October 24, lat. 17° 54′ S., long. 33° 10′ W. Wind northeast. A shearwater, probably *Puffinus puffinus*, flew in our wake for a few minutes about eight o'clock A. M. During the early forenoon we saw few petrels (*Oceanites oceanicus*), and these kept well away from our stern, but the numbers increased up to the middle of the afternoon. When flying rapidly, and suddenly perceiving food, they sometimes stopped their headway by flopping down as though wounded and striking their breasts upon the surface of the water. Often as they pattered along for some distance on set, slightly depressed wings, they resembled small scurrying quadrupeds more than anything else.

October 25, lat. 20° 11′ S., long. 33° 35′ W. We ran freely before a north-northeast wind, furling the fore-and-aft mainsail during the morning. The few petrels (*Oceanites*) seen did not follow in our wake.

October 26, lat. 21° 40′ S., long. 34° 12′ W. A dull morning after a stormy night; variable head winds during the day. The first skua (*Catharacta*) was seen shortly before noon. It circled the brig several times with swift, steady flight. At four o'clock another skua was seen. I shot it as it rested on the water, lowered the dory and secured it. I have identified it provisionally as the Falkland Island race of the Antarctic Skua *Catharacta antarctica falklandica* (Lönnberg).

October 27. Two more individuals of *Catharacta* were seen toward evening.

October 28, lat. 23° S., long. 35° 45′ W. We encountered cooler weather and a heavy ground swell, indicative of storms to the

southward. At six o'clock in the morning the steward came to notify me that a 'Goney' (Wandering or Great Albatross, *Diomedea exulans*) was about. I hurried on deck. Nearby in the morning sunlight flew the long anticipated fowl of the Ancient Mariner, even more majestic, more supreme in his element than my imagination had pictured. He was mature — all white and black— and as he turned and turned, now flashing his bright under side, now showing the black that extended from wrist to tip on the upper surface of his wings, he seemed scarcely to quiver the narrow planes, but lying on the invisible currents of the breeze, followed his pinkish bill wheresoever it led him.

He remained with us only a few minutes, but at noon he came back again, covering tens of miles in the swift wide circles which he traversed astern. The lower wing often cut the water in his turns, and he used his great webbed feet perhaps more than his stubby tail in steering. Twice he dropped into the sea and allowed us to draw away a long distance before rising and overtaking us. It was a curious sight when he prepared to alight under our stern, and then, changing his purpose, ran heavily along the water for a hundred yards, before his stiffly set wings could raise his large body into the air.

During the afternoon he appeared irregularly, approaching inconspicuously just above the waves, and suddenly flashing up right alongside. We saw the last of him about five P. M.

October 29, lat. 24° 42′ S., long. 37° 10′ W. At half-past nine in the morning an albatross, apparently the bird of the previous day, appeared again, flying even more admirably in a higher wind. The first 'Cape Hens' or 'Night-hawks,' *Procellaria æquinoctialis*, were seen shortly after midday.

October 30, lat. 26° 20′ S., long. 38° 04′ W. Strong southeast winds. Two Wandering Albatrosses (*D. exulans*) were with us together, a black and white adult, and a young grayish bird smaller than its fellow. They performed together in the high breeze, alighting on the water gracefully enough, the strong wind buoying them until they actually struck the surface. Once they alighted together and fed in the midst of a flock of *Oceanites oceanicus*. At six o'clock P. M., a third albatross appeared.

October 31, lat. 27° 15′ S., long. 39° 30′ W. Southeasterly winds. Many of *Diomedea exulans*, both old and immature, were seen. The *Oceanites* petrels were few.

November 2, lat. 30° 54′ S. Wind still southeast, moderating. Just at dusk a bird which I identified as the first 'Cape Pigeon' (*Petrella capensis*) flew across our stern. Albatrosses accompanied us until dark.

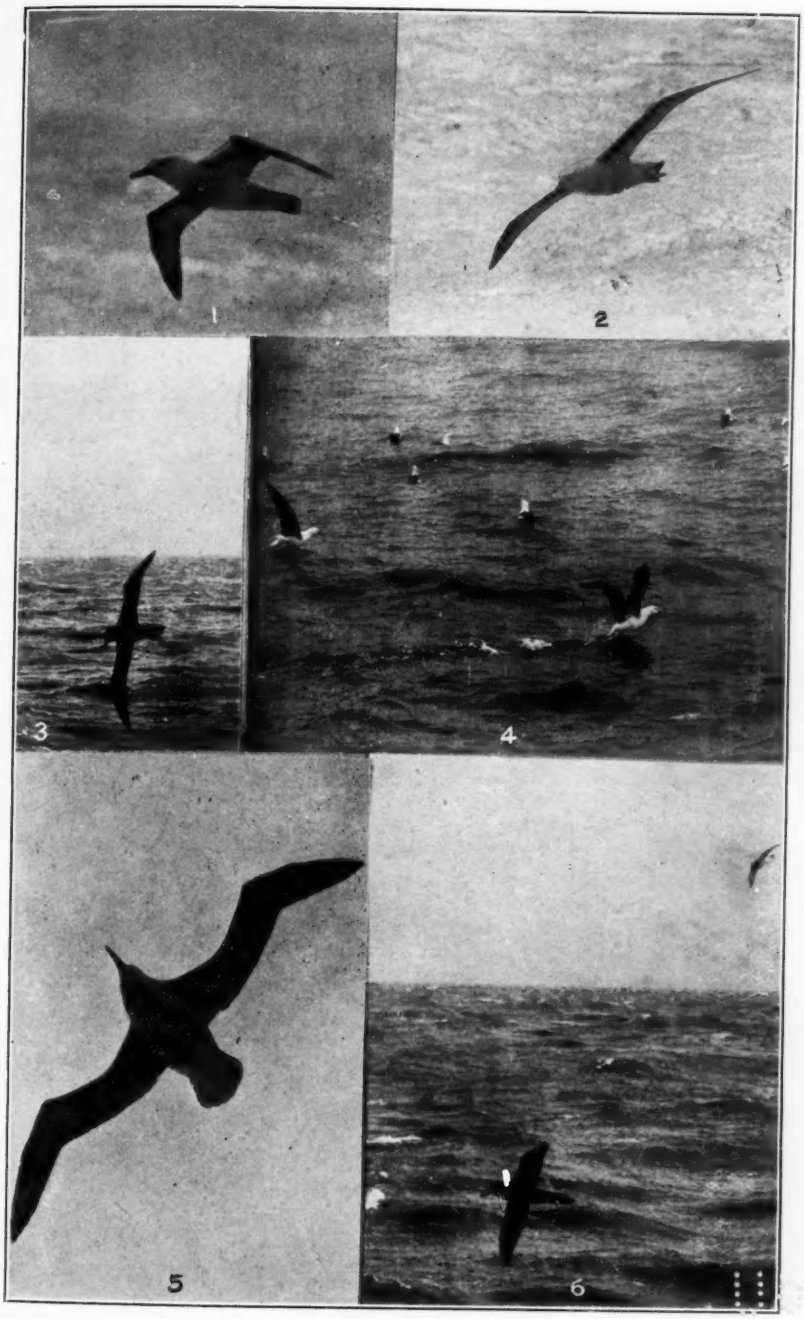
November 3, lat. 32° 09′ S., long. 42° 15′ W. Winds southwesterly, swinging by west toward the north and increasing in violence throughout the day. Another *Petrella* was seen at daybreak. In the strong wind I noticed that the petrels (*Oceanites oceanicus*) in our wake always *faced* the wind diagonally if not directly, with extended, motionless wings, whenever they pattered on the water. During the afternoon we were running before the wind, and the pursuing birds always wheeled and turned away from our stern before descending to "walk" and feed. While they were flying with the wind, on the other hand, they kept quite clear of the water.

November 4, lat. 33° 28′ S., long. 45° 42′ W. A strong nor'-wester blew throughout the night and morning, and we were obliged to luff into the wind after our lower fore-topsail had been blown away about two o'clock A. M. At daybreak a single individual of *Fregetta grallaria* was seen among the *Oceanites*. Albatrosses were within sight all day.

During the morning a flycatcher with a yellow belly, dark olive back, and broad white superciliary stripe (*Megarhynchus* sp.), flew aboard nearly exhausted, and perched in various parts of the rigging. At noon a species of Silver-billed Tanager alighted on the foresail yard, followed by a large moth, which like the two storm-beaten song birds flew off to leeward and its fate. We were approximately 340 miles from the South American mainland.

After noon the weather cleared somewhat, and moderated enough so that we hoisted the mainsail, reefed, and bent on a new fore-topsail in place of the one we had lost. The wind however soon shifted through west to south and commenced to blow a gale.

Early in the afternoon I began to trail fish hooks from the stern, and presently a Giant Petrel (*Macronectes giganteus*) took a bait and was captured. As the sea became rougher various Tubinares gathered astern, and we soon had our hands full "fishing for birds."



1, 2, 4 and 5. 'MOLLYMOKE,' *Diomedea melanophrys.*
3 and 6. SOOTY ALBATROSS, *Phœbetria palpebrata*, ALSO 'CAPE PIGEON,' *Petrella capensis*, AT TOP OF 6.

hauling the smaller species down from the air as animated kites after they had pounced upon the trailing baits and had started to fly off with them. Altogether the following thirteen species of Tubinares were about, and most of them might be seen at a single glance: — *Diomedea exulans, Diomedea melanophrys, Thalassogeron chlororhynchus, Phœbetria palpebrata, Macronectes giganteus, Puffinus puffinus, Æstrelata incerta, Priofinus cinereus, Petrella capensis, Halobæna cærulea, Procellaria æquinoctialis, Fregetta grallaria, Oceanites oceanicus.* In 'The Ibis,' April, 1914, p. 318, I have published a photograph which includes nine of these species. Specimens of *Diomedea exulans, Puffinus puffinus, Procellaria æquinoctialis,* and *Petrella capensis,* in addition to the *Macronectes* mentioned above, were captured. Next to the *Oceanites* the 'Mutton-birds' (*Æstrelata incerta*) were present in greatest numbers. The 'Cape Hens' (*P. æquinoctialis*) were very aggressive, driving off *Æstrelata, Puffinus, Petrella, Oceanites,* etc., and yielding to *Macronectes* and *Diomedea exulans* only after a struggle. Both *Procellaria æquinoctialis* and *Puffinus puffinus* dived well below the surface in pursuit of the baits. The former birds squealed loudly when caught, and defended themselves actively with their sharp, dangerous claws. I saw one aberrant example of this species with a white superciliary stripe and a white patch on the crown. At nightfall we saw large flocks of the 'Cape Hens' settling on the water.

A great many individuals of *Diomedea exulans* were seen at close range on this day, and I noticed that all were characterized by a pinkish stain on the feathers in the region of the ear. The Sooty Albatrosses (*Phœbetria palpebrata*) were unique among the species which followed us in that they seemed to pay no attention to the trailing fishlines.

The bait taken so eagerly by most of the birds was the fat and meat of a Loggerhead Turtle (*Thalassochelys*) which had been harpooned from the bow. The birds ignored pork fat as long as there was turtle meat. After seeing captives drawn on board the *Daisy* before their eyes, they were just as eager to bite as before. They seemed to learn nothing from experience. Even birds which had escaped from one hook, after having been hauled part way in, promptly snapped up another.

November 5, lat. 35° S., long. 46° 55′ W. Continuation of the rough weather; southeast wind. Tubinares abundant, but the 'Cape Hens' were so extremely aggressive about the baits that we could catch members of no other species. *Petrella capensis* and *Phœbetria palpebrata* were with us in increased numbers, and a second species of 'Mutton-bird,' *Æstrelata mollis*, was represented by a single individual.

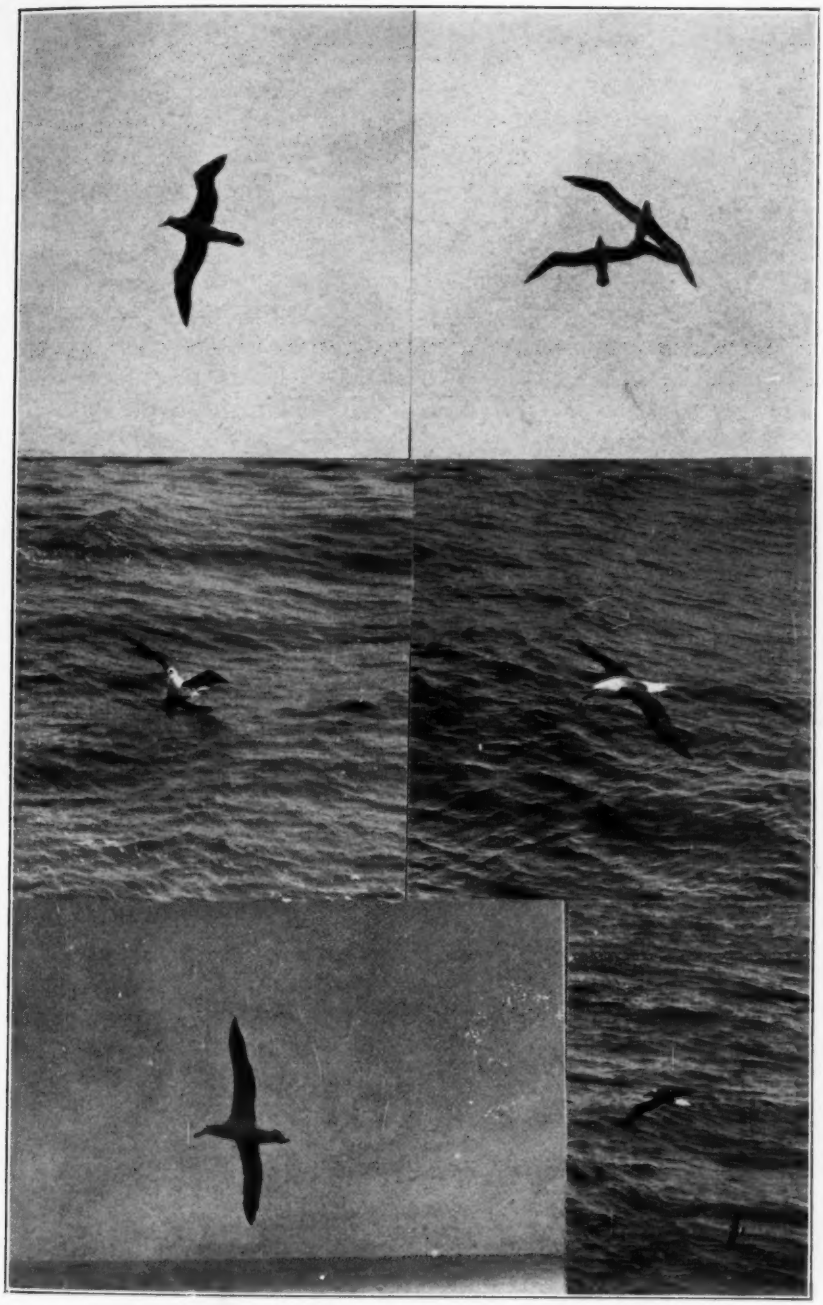
On November 6 there were heavy rains and driving mists all day, and we could see few birds from the vessel.

November 7, lat. 35° 40′ S., long. 46° 35′ W. Brisk westerly winds, clear. *Æstrelata mollis* fairly common. One individual of *Priofinus cinereus* followed us steadily all day. One of *Fregetta grallaria* was observed continually among the *Oceanites*.

November 8, lat. 36° 16′ S., long. 46° 35′ W. High northwesterly winds. One of *Fregetta grallaria* seen with *Oceanites* all day. 'Cape Pigeons' (*Petrella*) were abundant, and four or five of them repeatedly dropped to the water under our lee quarter, rising and overtaking us again after we had drawn away a few hundred yards. They ran like albatrosses, that is foot after foot along the surface when launching into flight. They followed a trailing bait by setting their wings as gliders, keeping the breast just an inch or so above the sea, and propelling themselves with rapid, alternating strokes of their feet. In this manner they sometimes covered long distances without an apparent beat of the wings. They were very noisy and quarrelsome while feeding. We caught two, which regurgitated quantities of lard-like fat.

The flocks of *Oceanites oceanicus* occasionally became much excited over the trailing bait, although they invariably disregarded it until after some other species had started the general scramble. On the evening of this day they (*Oceanites*) gathered in a cloud, to the number of a hundred or more, and tugged at the bits of pork fat until forced away by the larger birds. The Giant Petrels (*Macronectes*) were their worst enemies. These pot-bellied, vulturine creatures actually swam or flew out of their way in order to snap their bills at the smaller birds.

November 9, lat. 36° 46′ S., long. 46° 29′ W. It became calmer today. At five o'clock in the afternoon I lowered the dory, and during the next hour collected 36 birds. One was a tern (*Sterna*



FOUR UPPER VIEWS; 'MOLLYMOKE,' *Diomedea melanophrys*.
LOWER LEFT; WANDERING ALBATROSS, *D. exulans*.
LOWER RIGHT; GRAY-HEADED ALBATROSS, *Thalassogeron culminatus*, AND WILSON'S PETREL, *Oceanites oceanicus*.

paradisæa); all the others Tubinares. Very few of the birds showed any fear, or were disturbed by the roar of a gun. A 'Mollymoke' (*Diomedea melanophrys*) hovered over the dory at a distance of six or eight feet for many minutes. It seemed much interested in us and followed the little boat whichever way we turned. I found that a winged specimen of *Procellaria æquinoctialis* could swim about as fast as a lusty sailor could row. One *Fregetta grallaria* flew nearby as we came on board the brig at dusk.

November 11. Heavy fog; calm; no reckoning. Three 'Whale-birds' (*Prion* sp.) were observed. The 'Whale-bird' or 'Blue Petrel' breeding at South Georgia seems to be *Prion banksi*, and by this name I shall designate the species seen in the South Atlantic.

Late in the afternoon a long stick of lumber floated past us. It was covered with 'goose barnacles' and accompanied by the usual school of fish, and four skuas (*Catharacta* sp.) were standing upon it. One 'Mollymoke' (*Diomedea melanophrys*) followed us throughout the day.

November 12, lat. 39° 41′ S. Brisk northerly winds varying toward the east. The first large mass of floating kelp (*Macrocystis*) was sighted. *Prion banksi* became abundant. *Phœbetria*, and a flock of *Sterna* (*paradisæa?*) were noted. One of three 'Cape Pigeons' (*Petrella*) which followed us for a time had a bright, rose-colored breast, doubtless due to some oily substance upon which it had been feeding. The ejecta of captive 'Cape Pigeons' were sometimes pinkish or orange.

November 14, lat. 42° 24′ S., long. 42° 28′ W. Moderate wind, cold. Early in the morning before any *Oceanites* petrels had picked up our track, four of *Diomedea melanophrys* were following us and flying forward again and again around the bow. Presently the first recorded example of *Thalassogeron culminatus* flew over the quarter deck almost within arm's reach. All five of these 'Mollymokes' remained with us during the day. They occasionally dropped to the water for food, and I saw one *D. melanophrys* dive quite out of sight in our wake and come up with its bill full of something. When I put out a baited hook one of them alighted and examined it, but flew off again without touching it. Thereafter the birds halted in the air for an instant whenever they spied the trailing pork fat, but after cocking their heads and eyeing it sharply,

they went on their way, refusing to be betrayed. They showed no hesitation in devouring bits of fat thrown overboard as a lure.

A few of *Procellaria æquinoctialis* were seen, but the most abundant birds of the day were the flocks of *Prion banksi* and *Priofinus cinereus*. Many of the latter species followed us all day long, flying low over the water, gliding a good part of the time. When they beat their wings it was with a more rapid motion than the other petrels; the flight was, indeed, somewhat duck-like. Toward nightfall we passed great bands of *Priofinus* sitting on the water. Numbers of *Halobæna cærulea* could be seen among the flocks of *Prion* all day. Both of these species travel rapidly, with a twisting, erratic flight, not unlike that of a Whip-poor-will (*Antrostomus*). The *Oceanites* were few; several skuas (*Catharacta*) were seen in the distance; and one albatross (*D. exulans*) passed nearby at six P. M.

November 15, lat. 43° 18′ S., long. 41° 10′ W. Colder, with a long, heavy "Cape Horn swell," and a strong westerly breeze. One example of *Fregetta grallaria* accompanied us during most of the day. 'Cape Pigeons' (*Petrella*) in groups of four and five descended under our lee quarter over and over again. When they turn back their heads and preen their feathers on the water they look for all the world like true pigeons.

Of eight 'Mollymokes,' our constant companions, six were *Diomedea melanophrys*, and two *Thalassogeron culminatus*. As usual, when they saw bait on the hooks astern, they raised their heads comically, and often wiggled their feet with a running motion, halted in the air, and assumed extremely awkward attitudes while deciding whether to descend or to fly on. When alighting they stretched down the legs and turned the toes upward. Then the broad webs struck the water at an angle and the birds slid forward a few feet, and slowly settled down, the wings being held high all the while.

At sunset birds of a dozen species were about in tremendous numbers, rioting in the breeze, and poising frequently over the *Daisy's* quarter deck, obviously interested in the affairs on board. Just as the sun was sinking beyond the choppy horizon, we heard a curious, braying call from among the waves. Then, half a ship's length to windward, we saw the first penguin (*Pygoscelis papua*).

Only its sleek head and bristly tail projected above the surface. It brayed again, and dived, but during the twilight of the next hour shoals of these slippery, reptilian birds kept passing us, for we heard their cries from all directions. The lookout at the masthead had reported penguins several days previously, but these were the first I had seen.

November 16, lat. 44° 57′ S., long. 39° 51′ W. High southwesterly and westerly winds; cold, squally. A rainbow was observed just before sunset. A troop of *Diomedea melanophrys* and *Thalassogeron culminatus* made up our escort on this date. Competition for food was becoming keen with them, and they dropped like falling pillows from considerable heights, assuming the most ridiculous attitude on the way down, whenever food was thrown from the brig. At evening one of the *melanophrys* 'Mollymokes' flew across the cabin repeatedly, jerking up its head like a spirited steed, and showing curiosity in its every action.

Æstrelata incerta was represented by greater numbers than at any time since November 9. At six o'clock in the afternoon there was a short but furious southwest squall with rain, and it was a beautiful exhibition to see the 'Whale-birds,' 'Mutton-birds,' 'Mollymokes' and Giant Petrels (*Macronectes*) rise high in the air and fly in the teeth of the wind. The giant petrels held their wings more straightly and stiffly, that is more like the set planes of an airship, than any of the other tube-nosed birds.

November 17. Very cold, with a high wind from the southwest, and a tremendous sea. Many changes of weather; at one time the wind veered to the east. Sleet and hail fell occasionally. Birds were with us all day, *Procellaria æquinoctialis* being conspicuous from its numbers.

November 18, lat. 48° 39′ S., long. 36° 40′ W. Barometer 29.2 inches at noon; rising at sunset. Temperature 40° F. High southwesterly gale all day, with several brief hailstorms. In the seething combers we lay to under fore-staysail and trisail. Dark weather alternated with bright sunshine. Spray broke over us continually, but we shipped no heavy seas.

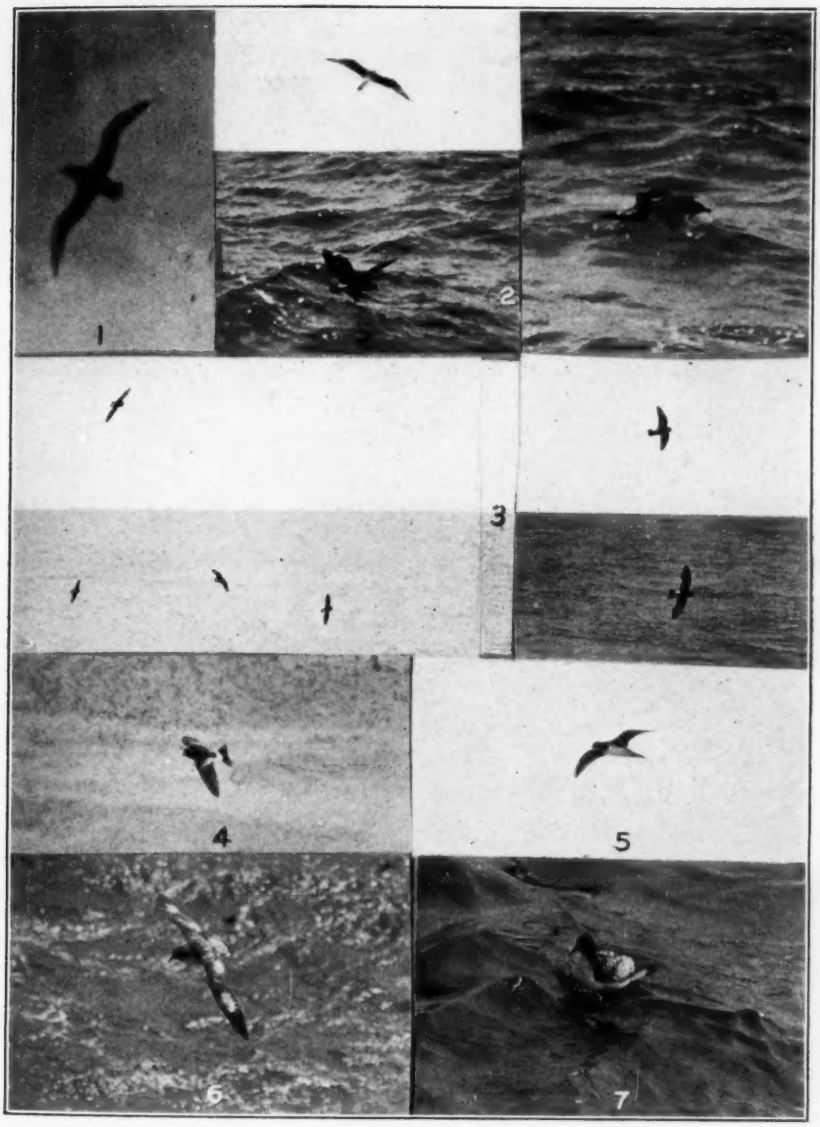
One individual of *Fregetta grallaria* was present all day with hundreds of *Oceanites oceanicus*. *Prion banksi* was the most abundant species. When these birds were flying high they turned

almost on their backs in the strong gale. They often skipped along the water in flocks, and, all springing up together, looked much like a school of gleaming flying fish. Four Sooty Albatrosses (*Phœbetria palpebrata*) joined us during the morning and remained nearby for several hours, flying with the preeminent grace of their kind. Their white-ringed eyes are conspicuous even at a long distance. The *melanophrys* 'Mollymokes' were on hand as usual. One or two of them took a hook but succeeded in shaking it out. While quarreling in the water over a bit of fat, several of them sidled amusingly round and round each other, croaking loudly all the while. In alighting during the gale they sometimes slid along the surface on their webs for ten or twelve feet, just as boys glide along an 'ice slide.'

Late in the afternoon the first example I had seen of the beautiful *Priocella glacialoides* flew over the deck and poised for a moment within a few feet of me. Then it dropped astern and fed on a piece of refuse, along with other species. At the same time another petrel white below, brownish above, with a little gray or brown on its neck, passed about fifty feet away. I believe it was *Thalassœca antarctica.*

All of these wonderful fliers from "Mollymokes" down to 'Mother Carey's Chickens' (*Oceanites*), with the single exception of the Giant Petrels (*Macronectes*), kept their wings flexed to a much greater extent during the gale than they had done in calmer weather; and with each more than ordinarily forceful puff of wind they bent the manus at right angles to the forearm, thus "shortening sail" still more. The birds rarely, if ever, flew directly before the wind, but either took it "on the quarter" or else headed into it, raised the body axis, and allowed themselves to be carried backward like a kite. The last method was regularly adopted by *Petrella capensis*, flocks of these birds covering considerable distances tail-foremost. The pinions of the longer-winged species could be seen to be always a-quiver; the gentle, almost unnoticeable rocking and see-sawing of the wings with the bird's body as a fulcrum, the gauging of the angle of the wing-axis with the horizon according to the sharpness of a turn, all revealing to the observer the constant action of the mechanism of balance.

But the Wandering Albatross (*D. exulans*) was more inexplicable



1. 'CAPE HEN,' *Procellaria æquinoctialis.*
2. PARASITIC JAEGER, *Stercorarius parasiticus* (3 photographs).
3 and 4. WILSON'S PETREL, *Oceanites oceanicus* (4 photographs).
5. SCHLEGEL'S PETREL, *Æstrelata incerta.*
6 and 7. 'CAPE PIGEONS,' *Petrella capensis.*

than his smaller brethren. He seemed to have one style of flight suitable for all weathers except a calm. The quivering of continual, automatic balance-stress was evident, but the huge wings appeared to be set the same whether for hurricane or catspaw, and he flew as though all directions were downhill. Probably the weight of the body is a powerful factor in the albatross's control of his momentum.[1]

November 19, lat. 49° 40′ S., long. 35° 51′ W. Continuation of the storm. *Fregetta grallaria* was observed in numbers for the first time, only single birds having been noted previously. *Halobæna cærulea* was common.

A few minutes before five P. M., a brief snow flurry came up with a violent southwest puff. In the midst of the storm three or four hundred 'Whale-birds' (*Prion banksi*) settled on the water near the stern of the *Daisy*, and for a quarter of an hour I had an opportunity of watching them feeding while many of the birds were within twenty feet of me. I soon understood the significance of the name 'scooper' which is applied by whalemen to the members of the genus *Prion*. The birds progressed along the water with an odd crawling motion, resting the breast upon the surface but holding the wings about an inch above it, the feet furnishing the motive power. Then as they scurried along quite rapidly the heads were thrust under the water and the open lamellated bills 'scooped' for food. It was impossible to determine upon what organisms the birds were feeding. To me the flock recalled a human swimming race in which each contestant was using the 'crawl stroke,' for the bodies of the birds were stretched out upon the water in much the same way. Continuously, however, birds would slip below the surface out of sight, and emerge a foot or two, or perhaps a yard, ahead. They did not stay under more than a fraction of a second except when they shot through the crest of a smallish wave, as sometimes happened. In a definite field on the water birds were disappearing below and reappearing with such rapidity that the area fairly twinkled. About as many were below as above all the time. There was a very rugged sea, with wide troughs between the waves, and whenever one of the great rollers with a white and

[1] cf. Nichols, Auk, XXX, 1913, p. 509.

broken crest came along, the birds did not attempt to dive through it, but arose from the water at the last moment, flew through the spume of the comber, and alighted on the downward slope beyond.

November 20, lat. 50° 12′ S., long. 34° 47′ W. Wind still southwesterly but moderating. The first Diving Petrels or 'Divers' (*Pelecanoides urinatrix*) were recorded, two passing us during the afternoon.

At evening four examples of *Phœbetria palpebrata*, two of *Diomedea melanophrys*, and four of *Thalassogeron culminatus* flew round about us, and contended more or less for a trailing bait, but we could hook none of them securely. Nine times out of ten the ubiquitous 'Cape Pigeons' succeeded in stealing the baits from the lines before the 'Mollymokes' could disperse them. One 'Cape Pigeon' alighted in the stern whale boat where it squatted on the whole length of its metatarsus, and was unable to rise into flight. I caught it in my hands. The bill in this species is comparatively soft but the captive nevertheless drew my blood with the sharp nail of its maxilla. It also scratched with its feet, but not so severely as *Procellaria æquinoctialis*. One of the latter tore a shred of skin from a sailor's arm with its powerful claws.

The Sooty Albatrosses (*Phœbetria*) were the wariest of the large birds. They quarreled among themselves when on the water, and uttered weird, trumpet-like calls. They would not dive for food, but they seized floating oakum, bits of paper, etc., and shook them in the water so that the foam flew. Three of these birds alighted successively astern, and solemnly picked up a chip of wood, possibly in order to determine whether it were something edible. The 'Sooty's' broken, white, orbital ring gives it a wide-eyed, perpetually astonished expression.

The four *culminatus* 'Mollymokes' dived so deeply for bait that only their tails and the tips of their wings projected above the surface.

During the early evening the quartet of Sooty Albatrosses flew across our deck amidships several times, and watching my opportunity I shot one so that it fell into the arms of a sailor.

November 21, lat. 51° 37′ S., long. 34° 56′ W. Southwesterly winds. After noon three Sooty Albatrosses (*Phœbetria*) overtook

us again, doubtless the same group which had accompanied us for several days, and of which I had shot the fourth member.

Three or four Wandering Albatrosses (*D. exulans*) were seen, more than we had counted for many days. They were in the distance, but there is no mistaking their wing-spread, and broad white backs, after they have been well noted once. A tern, probably *Sterna paradisæa*, and one example of *Priocella glacialoides*, were identified, and a *Prion* was observed to scratch its head with its foot while flying, a rather 'Sternine' trick.

November 22, lat. 53° S., long. 35° 25′ W. Quiet sea, heavy fogs during part of the day; icebergs and floe ice. On this date the birds were feeding in all directions about us, but they did not follow in our wake, probably because of the very light wind. The trio of Sooty Albatrosses (*Phœbetria*) appeared during the afternoon as usual. Increased numbers of *Thalassogeron culminatus* were seen.

A storm blew up from the southeast during the night and we made little progress.

November 23. It was rough all morning with considerable rain and wet snow. 'Lifts' alternated with bad weather all day. During the forenoon two Snow Petrels (*Pagodroma nivea*) flew close alongside and remained nearby for some time. Later we saw others flying hither and thither well above the water. A couple of them brushed the rigging with their wings.

A little after three o'clock the cry "Land-ho!" came from the bow. The mist lifted somewhat, and we made out the snow-covered highlands of South Georgia. As we drew shoreward our three Sooty Albatrosses (*Phœbetria palpebrata*) circled us continually, poising sometimes on the mastheads and the tip of the bowsprit. We saw more Wandering Albatrosses and 'Cape Pigeons' than ever before. Some of the latter wiggled their feet with a running motion as they flew, a trait which I had previously observed in *Prion banksi*, *Æstrelata incerta*, and *Diomedea melanophrys*. At evening a pure white example of *Macronectes giganteus* flew by within a couple of hundred feet.

November 24. A clear and beautiful day. There was some fog along the coast during the early morning, but it lifted early, showing the abrupt, white-robed mountains under the brightest of skies. Innumerable birds flew over the water on every side, and for the

first time we saw many Tubinarine species flying high — far up under the light feathery clouds, so that at times the birds were indistinguishable specks. *Macronectes giganteus, Phœbetria palpebrata, Diomedea exulans, Thalassogeron culminatus, Procellaria æquinoctialis,* and even *Prion banksi* and *Petrella capensis* were among those seen soaring like birds of prey under the blue vault.

The ornithological notes of a four months' stay in the cold fjords of South Georgia do not properly belong within the scope of this paper, so I shall pass to the end of the Antarctic summer when on March 15, 1914, we pointed the good brig *Daisy's* prow toward the open sea and began the homeward voyage. The afternoon was calm, and over the sea near shore were myriads of the smaller Tubinares — *Petrella capensis, Pelecanoides urinatrix, Oceanites oceanicus,* and *Fregetta grallaria.*

March 16. Rough and squally; the mountains of South Georgia still visible. One individual of *Thalassœca antarctica* seen.

March 17. Brisk southerly winds after a night of "tumbling calm." One skua (*Catharacta*) passed us flying northward. Four Sooty Albatrosses were about, of which one was the typical *Phœbetria palpebrata,* the familiar South Georgia breeding species with a canescent back. The other three were dark colored on the back and belly, and contrasted markedly with the first bird. Moreover, when one of the dark albatrosses flew close to the brig, I saw distinctly that the sulcus of its mandible was yellow instead of blue, showing that the three unfamiliar birds were referable to the species *Phœbetria fusca,* not before identified on the expedition.

Two examples of *Thalassœca antarctica* were recorded, and *Priofinus cinereus* became common during the day, the first bird being seen when we were still within a hundred miles of South Georgia.

March 18, lat. 49°+ S. Wind west by north. A large number of *Diomedea exulans* were noted, many of which were immature and in the speckled, chocolate plumage. One example of *Phœbetria fusca* and several of *palpebrata* were seen. The numbers of *Priofinus cinereus* had increased, many flying across the cabin roof in Indian file during the afternoon. In the strong wind they glided on set wings. Two skuas (*Catharacta*) passed, flying rapidly and well above the water, as if upon a definite migration.

March 19, lat. 48° 30′ S. Strong northwesterly winds; cloudy. A *Thalassogeron* with a light gray head and an all black bill followed us. It was perhaps an immature example of *T. culminatus*. *Æstrelata mollis* became abundant; two of *Priofinus cinereus* and one of *Priocella glacialoides* were noted. Late in the day we were accompanied for a while by no less than twenty 'Mollymokes' (*Diomedea melanophrys*).

March 20, lat. 47° 20′ S., long. 34° 25′ W. Light west winds, brisker during frequent mild rainstorms. A rainbow was observed late in the afternoon. *Diomedea exulans* was common. I saw several Sooty Albatrosses (*Phœbetria*) of both species, and one skua (*Catharacta*).

March 21, lat. 45° 50′ S., long. 33° 52′ W. Strong westerly winds and a rough sea which frequently slopped over the deck during lee lurches. *Æstrelata incerta* appeared for the first time on the northward voyage and I saw three or four birds of this species in our wake throughout the day. A single example of *Puffinus gravis* also tracked us during the morning. *Oceanites oceanicus* and *Fregetta grallaria* were noted sparingly. All the Sooty Albatrosses seen were *Phœbetria fusca*, and when the graceful birds crossed slowly over our stern, with wings flexed in the high wind, I could see the orange or yellow sulcus of the mandible quite distinctly. One of these birds tucked down its head and preened the feathers of its belly while it flew.

March 22, lat. 43° 20′ S., long. 33° W. A bright, mild day with a gentle southwesterly breeze. Two yearling albatrosses (*Diomedea exulans*), all blackish except for their white faces and under wing surfaces, flew about in company. At sunset a skua (*Catharacta*) circled our main topmast and then flew off toward the east. After nightfall a few examples of *Æstrelata mollis* were still seen following us in the bright moonlight.

March 23, lat. 42° 20′ S., long. 31° 45′ W. Northerly storm with a very rough sea all day. We were obliged to run east, and even south of east. Enormous numbers of *Prion banksi* were about, more than I had seen at any time since leaving the South Georgia banks. Many typical examples of *Phœbetria fusca* were seen, one of which, probably a young bird, had a buffish collar.

March 24, lat. 43° S., (dead reckoning). Strong northerly winds.

Oceanites oceanicus and *Fregetta grallaria* were abundant. We caught twelve Wandering Albatrosses (*Diomedea exulans*) on fish-hooks. One of these was a nearly fully mature male; three were adult females; the remainder were younger birds including several blackish yearlings. When one of the albatrosses was held up by its feet a squid with a body a foot long dropped out of its gullet.

An example of *Æstrelata macroptera* was recorded for the first time.

March 25. A severe southerly gale, commencing at 9 P. M. of March 24, continued until early morning of March 26. The sea was very rough, and running before the wind under short canvas we frequently shipped water over either rail when we rolled. Now and then seas broke over our stern. We were able to bend on more sail about midnight.

Diomedea exulans and *Phœbetria fusca* were about in large numbers, the Sooty Albatross with the buff collar being among the others. *Æstrelata incerta* was the petrel seen in greatest abundance. A few of *Puffinus gravis*, *Oceanites oceanicus* and *Fregetta grallaria* were seen.

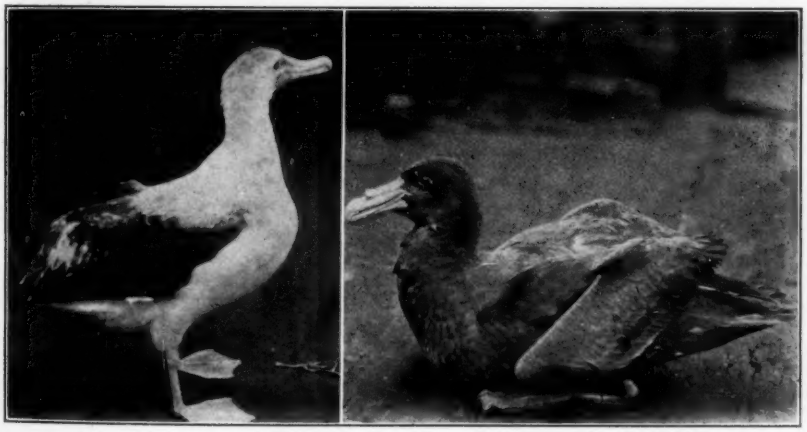
March 26, lat. 38° 50′ S., long. 31° 30′ W. Light winds; overcast sky. The buff-collared example of *Phœbetria fusca* was seen among many others; *Diomedea exulans* was numbered by scores. Young birds of the latter species were "gamming" everywhere on the water — that is meeting in groups, raising their wings and bills, and squealing, just as I had often seen them do on the South Georgia whaling banks. A skua (*Catharacta*) flew around the ship in a characteristic way.

At evening, there being scarcely any breeze although the ground swell was heavy, I lowered the dory and remained down until after dark. I shot three specimens of *Phœbetria fusca*, and also one or more of *Æstrelata incerta*, *Æstrelata mollis*, and *Puffinus gravis*.

Long after nightfall hosts of Tubinares could still be seen and heard flying everywhere over the sea.

March 27, lat. 37° 40′ S., long. 30° 58′ W. Strong west wind, with several rain squalls, heavy sea. The buff-collared *Phœbetria* was noted throughout the day.

March 28, lat. 35° 20′ S., long. 30° 50′ W. Westerly winds; frequent squalls. *Diomedea exulans* was the commonest species. One



1. Tubinares on the Whaling Banks north of South Georgia Island. 'Whale-birds,' *Prion banksi;* 'Cape-Hens,' *Procellaria æquinoctialis;* and 'Mollymokes,' *Diomedea melanophrys.*

2. Tubinares on the Water: chiefly Wandering Albatrosses, *Diomedea exulans;* Giant Petrels, *Macronectes giganteus;* and 'Cape Pigeons,' *Petrella capensis.*

3. Captive Female Wandering Albatross (on left), and Giant Petrel (on right).

or more of *Puffinus gravis*, *Æstrelata macroptera*, and *Fregetta grallaria* were seen.

March 30 and 31, April 1. The first summery days, with quiet weather, fair skies, and brilliant sunsets. On these three days I saw no birds save a few 'Mutton-birds' (*Æstrelata incerta* and *mollis*).

April 2, lat. 27° 17′ S., long. 31° 53′ W. The wind had veered to northeast on the evening of the first, and it blew half a gale during the morning of the second, bringing frequent rains. Half a dozen 'Mutton-birds' (*Æstrelata incerta*) followed us. At night we had heavy rains with lightning and thunder.

April 4, lat. 25° S., long. 30° 40′ W. Three examples of the Trinidad Islet Petrel, *Æstrelata arminjoniana* were identified. It rained heavily throughout the night.

April 5 and 6. Light southerly breezes; more or less rain. The only birds seen were *Oceanites oceanicus*, *Æstrelata arminjoniana*, and a few terns and boobies (*Sula*) in the distance.

April 7, lat. 21° 30′ S., long. 30° 04′ W. Calm and hot, with a light south wind arising late in the afternoon. A few terns and boobies, *Oceanites* petrels and scattered examples of *Æstrelata arminjoniana* were seen. Shortly before nightfall we sighted Trinidad Islet, bearing north by west and about 45 miles distant.

April eighth was spent in the waters about the remarkable, uninhabited, volcanic islet of Trinidad, and the ornithological observations of the day may well be reserved for a special paper.

The *Daisy* resumed the northward journey on April ninth, but bird life was not conspicuous between Trinidad and the Equator which we crossed on the afternoon of April twenty-fifth. The little 'Mother Carey's Chickens' (*Oceanites oceanicus*), our constant companions during nearly the whole voyage, were seen almost daily, not only as far as the Line but northward to the West Indies and then to New York. Boobies and terns were frequently noted in the southern tropic belt, although very rarely were they seen so closely that I could identify the species. The few other south Atlantic entries in my notebook refer chiefly to sea birds which belong typically to the fauna of the north Atlantic; and these may best be recorded elsewhere.

Birds of the South Atlantic: Summary of Records.

TABLE I.

Species and numbers of birds seen on the southward voyage, October–November (spring). Pre-nuptial season.

Symbols:—
+ = "a few"
✳ = "large flocks"
** = "beyond estimation"

| | Latitude and Longitude | | |

Birds of the South Atlantic: Summary of Records.

TABLE II.

Species and numbers of birds seen on the northward voyage, March–April (autumn). Post-nuptial season.

Symbols:—
+ = "a few"
* = "large flocks"
** = "beyond estimation"

	Latitude and Longitude.																																									
	March																	April																								
	South Georgia			49°+S.	48°30′S.	47°20′S. 34°25′W.	45°50′S. 33°52′W.	43°20′S. 33° W.	42°20′S. 31°45′W.	43° S.		38°50′S. 31°30′W.	37°40′S. 30°55′W.	35°20′S. 30°50′W.	33°20′S. 29°52′W.	31°24′S. 30°56′W.	29°31′S. 30°42′W.	28°46′S.	27°17′S. 31°53′W.	26°20′S. 31°30′W.	25° S. 30°40′W.	25°56′S. 30°08′W.	23° S. 30°05′W.	21°30′S. 30°04′W.	Trinidad Islet.		16°42′S. 30°43′W.					6°03′S.						2°47′S. 34°15′W.					Equator
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Catharacta antarctica	+	..	1	2	..	1	..	1	..	..	..	1																														
Oceanites oceanicus	*	*	*	+	2	1	3	+	1	*	..	+	..	1	..	..	..	1	1	..	6	4	+	+	..	2	1	..	..	..	1	+	..	8	+	*	*	*	*	*	*	*
Fregetta grallaria	*	*	*	*	2	..	1	..	..	*	+	..	..	2																												
Puffinus gravis	..	..	..	..	..	..	1	..	1	1	+	2	+	+	3																											
Priofinus cinereus	..	..	*	*	2	3	+	+																																		
Thalassœca antarctica	..	1	2																																							
Priocella glacialoides	..		..	..	1																																				
Procellaria æquinoctialis	+	+	1	1	1	3	2	..	2	..	..	1																														
Æstrelata macroptera	..	..	..	..	..	..	..	..	..	1	1	1	2	2	1																											
Æstrelata incerta	..	..	..	..	..	..	+	..	+	+	*	+	+	+	*	+	+	+	+	+																					
Æstrelata mollis	..	..	..	+	*	*	*	*	+	+	+	*	*	+	+	+	..	..	..	..	3	+	+	+	*																	
Æstrelata arminjoniana	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..																									
Macronectes giganteus	+	..	1	3	2	..	1	..	..	1																															
Petrella capensis	*	*	*	+																																					
Prion banksi	*	*	+	+	+	+	+	+	**	+																															
Pelecanoides urinatrix	*																																							
Diomedea exulans	+	*	*	*	1	*	+	+	+	*	*	*	*	*	*	+																									
Diomedea melanophrys	..	+	..	1	20	+	1	1																																	
Thalassogeron culminatus	..	..	..	?	?	?	?	?	..	..	..	1																													
Thalassogeron chlororhynchus	..	+	+	4	1																																				
Phœbetria fusca	..	..	3	1	1	+	4	2	*	*	*	*	+																												
Phœbetria palpebrata	4	..	1	+	1	+																																			

THE DEVELOPMENT OF THE STOMACH IN THE EUPHONIAS.

BY ALEX. WETMORE.

THE stomach of the small brightly colored Tanagers known as Euphonias has long been noted as one of the most anomalous in the avian group, but to my knowledge no explanation for its peculiarities has been attempted. During recent field work in Porto Rico for the Biological Survey, and in subsequent laboratory investigations, it has been my fortune to examine critically 51 specimens of the Porto Rican Euphonia (*Tanagra sclateri*) and on these examinations the following observations are based.

In the long array of species forming the order Passeriformes the stomach is composed ordinarily of two parts; a smaller, constricted glandular portion, the proventriculus, connected with the œsophagus, and a larger, more or less muscular division the ventriculus, which opens into the duodenum by the constricted pyloric orifice. In the Euphonias, however, a different development is encountered. The glandular proventriculus is large and well developed while the stomach proper is indicated by a thin, transparent, membranous band or zone which passes over without lessening in size into the dilated end of the small intestine, lined internally with projecting villi. In addition the passage from the œsophagus down is direct, without apparent cardio-pyloric flexure, a combination of peculiarities that stamps this group of species as unique among their feathered kindred.

Attention was drawn to the intestinal tract of the Euphonias by Lund in 1829 but he was misled into describing a lateral diverticulum of the zonary portion, which he considered as the rudimentary ventriculus. For fifty years his discussion and plates were quoted and reproduced by other zoölogists so that they are found in many of the standard texts published during that period. The eminent English ornithotomist W. A. Forbes reviewed these facts before the Zoölogical Society of London in 1880, disproving the presence of Lund's ventricular diverticulum, but was unable to assign any reason for the aberrant structure which he found.

In my work in the field I soon learned that the Euphonias fed eagerly on mistletoe-berries of the genus *Phoradendron*, clumps of which were locally common in tree growth. This habit was well kown to the Porto Ricans and has been reported from various islands in the Lesser Antilles where these birds are known as "mistletoe birds." From their restless activity in the tree tops I was led to believe that they were feeding on insects as well but in the critical examination of the stomachs, seeds of three species of *Phoradendron* and one other of an allied Loranthaceous genus were encountered alone with absolutely no trace of animal matter. The globular berries of these mistletoes have a moderately tough skin containing a seed surrounded by a yellowish-green transparent fluid, gelatinous in appearance and exceedingly viscid. In feeding the Euphonias break this outer skin with their bills and swallow the single seed surrounded by its adhesive pulp. The seeds pass through the intestinal canal wholly undigested and the whole mass is excreted in apparently the same condition as when it was swallowed, as the fæces are amorphous and exhibit practically none of the white nitrogenous renal matter commonly noticed in other birds.

Though the adhesive pulp surounding the seed is apparently unchanged by the processes of digestion yet we know that some part is taken from it. A large per cent of it is composed of viscin — or as it is popularly called bird lime — and several gums, and these act as a vehicle for various salts of potash, lime and magnesia, vegetable acids and oxide of iron a highly tonic purgative combination.

Arabine present in the gums is readily dissolved, furnishing grape sugar, other nutritive matter is contained and with the various salts, of the highest importance to the body, is readily assimilated. Thus mistletoe apparently furnishes a highly nourishing food from which the nutritious elements are easily separated by the digestive juices without preliminary grinding and trituration. A considerable amount of bassorin which is contained in the bird-lime is insoluble in ordinary fluids while in water it becomes viscous which accounts for the lack of change in appearance of the food in passing through the alimentary canal. In captivity this bird thrives on a diet of over-ripe banana, a food which, like the mistletoe berries, can be assimilated readily without mechanical comminution. In a wild state however it eats only the mistletoe berries.

The outcome is readily seen. Through a long period of subsistence on a peculiarly specialized food the ordinary form and muscularity of the stomach has been lost through disuse and specialization until it has been changed to the simple membranous sac connecting the œsophagus and duodenum, now characteristic of the Euphonias, a digestive tract which is so arranged as to permit the rapid and unobstructed passage of food through the entire length of the canal.

The Euphonia, furthermore is enabled to increase its own food supply as the seeds unharmed by digestion are excreted and cling by their adhesive coating to the limbs of the trees, starting new plants which, when mature, produce a new crop of berries. Though in some parts of the United States, notably Louisiana and Texas, mistletoe plants increase until the tree host is killed, in Porto Rico they cause little apparent damage and no effort is made to keep them down. They were noticeably more abundant on the dry south coast, where the air soon hardened the gum surrounding the seeds, than they were on the rain swept north slopes of the mountains, where seeds dropped by the birds are liable to be washed off before germination and attachment.

Some forms of the family Dicæidæ notably *Dicæum hirundinaceum* of Australia are called mistletoe birds, and are said to feed extensively on the berries, but I can find no satisfactory description of their stomach. The Robin, Bluebird, Cedar Waxwing and others which occasionally feed on mistletoe berries in the United States do so locally or rarely and use this food merely to supplement their ordinary diet. In my studies I have been restricted to the investigation of the Porto Rican Euphonia, through lack of other material but as parasitic plants of the family Loranthaceæ, belonging to either the genus *Phoradendron* or to others more or less closely allied, are found all through tropical America in the range of the Euphonias we may suppose that they are utilized as food by these species as by the bird which I have studied. This habit sufficiently accounts for the peculiar stomach found in the group as a whole.

To recapitulate, the Euphonias have long been noteworthy for the aberrant form of the stomach. In studying the species found on Porto Rico it has been found that it feeds entirely on the berries of mistletoe (*Phoradendron* spp.) a food readily assimilated and one

not requiring a muscular stomach for its digestion. In consequence we have a degeneration of the ventriculus into a thin membranous band and a straightening of the stomach to facilitate the passage of food no cardiac or pyloric constriction being necessary to hold matter in the ventriculus for digestion as the process of conversion is carried on wholly by the secretions of the alimentary canal.

ANATOMICAL NOTES ON TROCHALOPTERON AND SICALIS.

BY HUBERT LYMAN CLARK.

THROUGH the kindness of Mr. Outram Bangs, I have recently had the opportunity of examining freshly-killed specimens of the 'Chinese Thrush' (*Trochalopteron canorum*) and the 'South American Yellow Finch' (*Sicalis flaveola*). There is no other reason for associating these two species in this brief paper than that they happened to come into my hands at about the same time. So far as I can ascertain no species of either genus has ever been examined with reference to either its pterylosis or internal anatomy. This is my warrant for publishing these meagre notes.

TROCHALOPTERON.

When the plucked carcass of this bird (*T. canorum*) is compared with that of a Robin (*Planesticus migratorius*), the most striking difference is in the width of the feather-tracts. The body of Planesticus is about one fourth longer than that of Trochalopteron and proportionately heavier but the feather-tracts are two to four times as wide. Thus in Trochalopteron, the upper cervical tract where narrowest is 2 mm. wide, the dorsal diamond-shaped tract is 13 mm., the dorsal tract posterior to the diamond is 3 mm. and the sternal tract, where widest, is 5 mm. across. In Planesticus,

the corresponding measurements are 5 mm., 25 mm., 12 mm. and 11 mm. So far as the shape and position of the tracts is concerned there is no noteworthy difference, except perhaps the posterior dorsal tract, which contrasts with the dorsal "diamond" much less in the Robin than in the Chinese bird. The differences in the wings of the two birds are so well known, they need not be dwelt on here but it is at least interesting to note that in Planesticus the relative lengths of the primaries run thus: 78695432110. In Trochalopteron the arrangement is 54632178910 or the seventh primary may slightly exceed the second and first. The important point is that in the robin the wing is pointed by the outer primaries (6–9) while in Trochalopteron it is the inner primaries (3–6) which give the point. This is certainly a striking and perhaps an important phylogenetic difference. In both genera there are 9 secondaries and 12 rectrices as usual in passerine birds.

In their internal anatomy I failed to find any point of difference, between the two genera, which could be considered significant. In both, the manubrium of the sternum is notably long and large with a deep fork. In Trochalopteron, it is 6 mm. long, the arms of the fork are 5 mm. apart at the tip and the fork is 2.5 mm. deep. These measurements are in the fresh specimen. Of course, on a dried skeleton they would be much less.

The nostrils of Trochalopteron are very different from those of the robin but unfortunately this difference is not nearly so well shown in skins. In the Robin the nostril is a nearly horizontal slit, largely concealed by a bare membrane, when looked down on from above; the slit is widest posteriorly where its height is about one fourth of its length. In Trochalopteron, the nostril is somewhat kidney-shaped, oblique and quite unprotected by any membrane; its length is somewhat more than twice the width. Judging from a hasty examination of a number of skins, I think the character of the nasal openings is more or less altered in drying. In no other way can I account for the statement in the British Museum 'Catalogue' (Vol. VII, p. 326) that they are "longitudinal, with a large operculum." Certainly that description does not apply at all to the nasal openings in an alcoholic or freshly-killed *Trochaloptero canorum.*

SICALIS.

The carcass of this finch has been carefully compared with one of our American Goldfinch (*Astragalinus tristis*) without revealing any differences whatever in the pterylosis. The primary formula is 87 (or 78) 9654321 and the tail is a trifle less emarginate than in the goldfinch. The nostril is exposed and nearly circular. Nothing in the internal anatomy is noticeably different from what is found in Astragalinus. The tongue is possibly a trifle less fleshy. The tomia are markedly deflexed, a notable difference from the nearly straight tomia of the goldfinch. On the roof of the mouth in Sicalis, at the posterior end of the upper mandible is a conspicuous tubercle, back of which on each side is a minute pit. This tubercle may be seen in dry skins, as well as in alcoholic specimens, if the bill is opened. There is nothing like it in Astragalinus. It is also quite lacking in Serinus, an interesting confirmation of Mr. Ridgway's view that that genus is not a close ally of Sicalis. Perhaps it may be proper to add that my observations on the nostrils and the tomia of Sicalis and Serinus entirely confirm Mr. Ridgway's statements regarding those genera (Birds of North and Middle America, Vol. I, p. 522).

EARLY RECORDS OF THE WILD TURKEY. II.

BY ALBERT HAZEN WRIGHT.

THE HUNTING AND TRAPPING OF THE WILD TURKEY.

The hunting and trapping of this wary bird has furnished the literature of out-of-door magazines many an interesting column in the last forty years, a period following the range (250 years) of the subsequent notes. These represent most of the present day methods of capture and cover a wide stretch of country as well as range of time. Of the general wariness of the species (Michaux, l. c., pp. 216, 217) writes as follows: "The wild turkies, which begin

to be very scarce in the southern states, are plentiful in those to the westward. In the most uninhabited parts they are so tame as to be easily killed with a pistol-shot. In the east, on the contrary, and particularly in the neighbourhood of the sea-ports, they cannot be approached without difficulty: they are not alarmed by a noise, but they have a very quick sight, and as soon as they discover the hunter, fly away with such rapidity, that it takes a dog several minutes to come up with them; and when they see themselves on the point of being caught, they escape by taking to flight. The wild turkies generally remain in the swamps, and by the sides of rivers and creeks, and only come out in the morning and evening. They perch on the tops of the highest trees, where, notwithstanding their bulk, it is not always easy to see them. When they have not been frightened, they return to the same trees for several weeks in succession." And, of the turkey on the southwestern prairies or plains near the Upper Red River, Long says,[1] "We daily saw — turkies; but these animals had acquired all the vigilance which results from the habit of being often hunted, and the entire want of thick forests, and even of solitary trees or inequalities of the surface to cover the approach of the hunter, rendered abortive most of our attempts to take them."

The aborigines have several methods of capture. According to T. Flint (l. c., p. 73) "The Indians and western sportsmen, learn a way to hunt them by imitating the cry of their young." Several other devices or practices of the Indians will appear in the following excerpts. In 1627, Isaac De Rasieries writes of the turkey in New Netherlands as follows:[2] "There are also very large turkeys living wild; they have very long legs, and can run extraordinarily fast so that we generally take savages with us when we go to hunt them; for even when one has deprived them of the power of flying, they yet run so fast that we cannot catch them unless their legs are hit also."

In writing of Capt. Brant in the Niagara region, P. Campbell remarks, that[3] "they rode on through the woods, and at last fell in

[1] James, Edwin. Long's Expedition to the Rocky Mountains —. Phila., 1823, 2 vols. Vol. II, p. 96.

[2] N. Y. Hist. Soc. Colls. New Ser. Vol. II, p. 354.

[3] Campbell, P. Travels in the Interior Inhabited Parts of North America in the Years 1791 and 1792. Edinburgh, 1793. pp. 202, 203.

with a large flock of Turkies, and galloped after them as hard as they could, until they obliged the Turkies to take wing and get upon trees, when the party alighted off their horses, and shot seventeen fine Turkies, with which they returned to camp. They all shot with rifles.... He (Lieut. Turner) told me when he was one day permitted to go along with them to the woods on a shooting party; that how soon they fell in with Turkies, the Indians pursued on foot as fast as they could run, bawling and hallowing all the time to frighten the birds, and when they had thus got them upon trees, that they shot many of them. Several other persons told me that this was the surest way to get them. They are so tame or stupid when they are in the trees, as to stand perhaps till the last of them be killed; whereas, on the ground, they are so quick sighted and fleet, that in an instant they are out of sight. An old Turkey Cock can outrun any man on the ground. Another method practiced, is that of watching them on the ground until they get up to roost in the trees in the evening, when the sportsmen may shoot on until the last in the flock be killed."

In 1824, John Hunter in the 'Memoirs of a Captivity among the Indians of North America," gives us the following manner of hunting:[1] "The turkey is not valued, though when fat, the Indians frequently take them alive in the following manner. Having prepared from the skin an apt resemblance of the living bird, they follow the turkey trails or haunts, till they discover a flock, when they secrete themselves behind a log, in such a manner as to elude discovery: partially display their decoy; and imitate the gobbling noise of the cock. This management generally succeeds to draw off first one and then another from their companions, which from their social and unsuspecting habits, thus successively place themselves literally in the hands of the hunters, who quickly despatch them, and await for the arrival for more. This species of hunting, with fishing, is more practised by the boys than the older Indians, who seldom, in fact, undertake them, unless closely pressed by hunger."

The Indians also used to employ a blow gun. McKinney when

[1] Hunter, John. Memoirs —. Third edit. with additions. London, 1824, pp. 282, 383.

on the Tombigbee River describes its operation thus:[1] "With the end in which the arrow is lodged in their mouths, a sight is drawn upon the object to be shot at; when with a sudden blow into the reed, the arrow is darted out the other end, and with a force sufficient to kill at twenty or thirty feet birds — and often wild turkeys." Concerning this same practice, Timberlake, 1762, when in Cherokee country, writes:[2] "There are..turkeys..pursued only by the children, who, at eight or ten years old, are very expert at killing with a sar-bacan, or hollow cane through which they blow a small dart, whose weakness obliges them to shoot at the eye of the larger sort of prey, which they seldom miss."

Thirty years after De Rasieries, Adrian Van der Donck in a 'Description of Netherlands, 1656' finds that[3] "Sometimes the turkeys are caught with dogs in the snow; but the greatest number are shot at night from the trees. The turkeys sleep in trees and frequently in large flocks together. They also usually sleep in the same place every night. When a sleeping place is discovered, then two or three gunners go to the place together at night, when they shoot the fowls, and in such cases frequently bring in a dozen or more. The Indians take many in snares, when the weather changes in winter. Then they lay bulbous roots, which the turkeys are fond of, in the small rills and streams of water, which the birds take up, when they are ensnared and held until the artful Indian takes the turkey as his prize."

The settlers and foreign sportsmen in general try all the Indian methods and invent others of their own. Latrobe, when at Little Rock, Arkansas, tries to imitate the turkeys as do the Indians. He says,[4] "Yet I plead guilty to having sometimes tried to coax the turkeys in rather an extraordinary way...The practical hunter will induce them to approach him as he steals through the grass, by skilful imitation of their gobble and piping. But often, as buried in the thick cane brake, and watching one of those little openings, where the birds sun themselves, I heard the tread, rustle,

[1] McKinney, Thos. L. Memoirs, Official and Personal; etc. 2 vols. N. Y. 1846, Vol. I, p. 163.

[2] The Memoirs of Lieut. H. Timberlake—. London, 1765, p. 45.

[3] N. Y. Hist. Soc. Colls. New Ser. Vol. I, 1841, p. 172.

[4] Latrobe, C. J. The Rambler in North America 1832–1833. 2 vols. New York, 1835, Vol. I, p. 205.

and voices of the turkeys around me, and have attempted to allure them to me by an imitation of their notes. I never succeeded in a single instance. I set up, for example, a weak, amorous, sentimental piping like the female, it was in vain! no broad backed, round-tailed, burly turkey-cock made his appearance. I gobbled in the most seducing fashion, throwing as much devotion into my tones as I could contrive; I essayed to compass a thousand blandishments into a few guttural sounds that were permissible, but these, far from eliciting any sympathetic response, seemed to put the whole gang to instant though cautious flight; for I invariably observed that very briefly, after an attempt of the latter kind, every sound became hushed, but the beating of my own impatient and disappointed heart. It was evident that there was no mistaking me for a turkey, and all the birds that I ever brought to the mess, were the fruits of a less guileful, more straight-forward and summary mode of proceeding."

Tibbits, in 1874, in 'Reminiscences of Early Days in Michigan' gives a variation of the turkey calling method.[1] "The wild turkey was very common, and vast flocks of several hundred were frequently to be met with. The usual method of hunting them, was for two or three persons to proceed cautiously through the woods till they came upon a flock, then suddenly fire at random amongst them, the object being to scatter them in all directions. When thus scattered they will invariably return to the same spot to get together again, the old ones coming first to call their young together. The hunters, hid in some secluded place with their 'turkey calls' ready for use, would wait patiently for the return of the old birds. These turkey-calls consist of the hollow bone of the turkey's wing, and, in the mouth of an experienced hunter can be made to exactly imitate the piping sound of the mother bird when calling her brood together. Soon the maternal notes of the old birds are heard, and the hunters respond with their 'calls,' luring them on to certain destruction. After the old birds are killed, the young ones fall an easy prey to the unerring aim of the skilful marksman. The flesh of the turkey is esteemed a great luxury, and one of the most delicious meals I think I ever ate was made from steak

[1] Mich. Pioneer and Hist. Soc. Colls. Vol. I, 1874–76. Wild Animals of Wayne County, Michigan. By J. S. Tibbits, p. 404.

cut from the breast of a young turkey, fried in butter, and partaken after a hard day's hunt, in which a companion and myself killed seven large fine birds."

In 1777 near Pamlico Sound, Elkanah Watson gives [1] "chase to a wild turkey, that maintained his equal right to the road, like a true North Carolina Republican; and, in spite of our efforts, he stretched away upon his long legs, far beyond our reach." The Hon. C. A. Murray holds to a somewhat different opinion. In the neighborhood of Kansas River, when he is [2] "crossing a wooded ravine a flock of turkeys, containing I think fifty or sixty, rose, and flew to a neighbouring thicket; as they were on the wing I fired a ball at random among them; it broke two or three feathers, but killed none. When my companions arrived, I halted them for half an hour, and went with the young American lad in pursuit of them; but they had beat us completely in the thicket, and we saw nothing more of them. Had we got them out on the open prairie we should have had excellent sport. A wild turkey runs with exceeding swiftness, but he cannot keep it up long, and his wings are not proportioned to the great weight of his body, so as to enable him to fly far. I have been told, that on a fair plain without trees, an active Indian or white man, could run one down in little more than an hour." The same gentleman recounts a hand-to-hand encounter he has with a wild turkey at Leesburgh, Va. "I was crossing a wooded ravine, when a large gobbler (so is the full-grown wild turkey-cock called here) started from the brushwood; my gun was only loaded with very small partridge-shot, but I discharged both barrels after the flying enemy, accidentally broke his wing; he came to the ground, and began to run like an ostrich. The little spaniel pursued in gallant style; but when he came up, was too small to hurt or hold his antagonist. I threw down my rifle and joined in the pursuit; at length I got hold of the turkey's leg; the grass was slippery with ice, and in his desperate struggle to escape he pulled me over on the ground, then he scratched my hands with his claws, and nearly blinded me by flapping his great wings

[1] Watson, W. C. Men and Times of the Revolution: or Memoirs of Elkanah Watson. New York, 1857. 2nd edition. p. 46.

[2] Murray, Hon. C. A. Travels in North America during the years 1834, 1835 and 1836. 2 vols. N. Y. 1839. Vol. II, p. 48, I, p. 88.

over my face and eyes; at last I contrived to seize his neck, and soon put an end to the contest. As he was too heavy a burthen for my little companion, I strung him across my back, and shouldering my rifle, returned in triumph to Leesburgh. During my walk homeward I felt no disposition to complain of the cold; for independent of my accoutrements, the turkey's weight proved, on my arrival, to be twenty-eight pounds."

Flint suggests another method for Kentucky in Boone's day. He holds that[1] "A man stationed near one of these paths (buffalo or bear paths) could kill game enough, with turkeys — in an hour, to supply the wants of a month. In Virginia Bruce suggests a method somewhat akin to that of Tibbits. He writes[2] "Of the two varieties of game (partridge and turkey), it is probable that the pursuit of the wild turkey afforded the Virginians much exertion as well as wariness to come up with it and kill it. Blinds of pine or oak boughs were erected at different eligible spots in the woods, and here, after scattering the flocks with trained dogs, the hunters would hide themselves, and by skilful use of the yelp, soon call up the confused and unsuspecting birds within range of the guns."

In the country of the Chickasaws (1724), according to Du Pratz, a dog is necessary to hunt them.[3] "The second day I had a turkey-hen brought to regale me. The discoverer who killed it, told me, there are a great many in the same place, but that he could do nothing without a dog. I have often heard of a turkey-chace, but never had an opportunity of being at one. On coming to the spot, we soon discovered the hens, which ran off with such speed, that the swiftest Indian would lose his labour in attempting to outrun them. My dog soon came up with them, which made them take to their wings, and perch on the next trees; as long as they are not pursued in this manner, they only run, and are soon out of sight. I came near the place of retreat, killed the largest, a second and my discoverer a third. We might have killed the whole flock; for while they see any men, they never quit the tree they have once perched on. Shooting scares them not, as they only look at the bird that

[1] Flint, T. 1832, Vol. I, p. 348.

[2] Bruce, P. A. The Social Life of Virginia in the Seventeenth Century. Richmond, Va. 1907, p. 212.

[3] Du Pratz, M. Le Page. The History of Louisiana. Paris 1758, London edit. 1774, pp. 134, 135.

drops, and set up a timorous cry, as he falls." In Canada (1844) Godley reports that[1] "Wild turkeys are tracked in the snow, and stalked like deer with rifles; they show excellent sport, but are very scarce in our provinces." When along the Alleghany River, Pa. (1807), Christian Schultz relies on an air gun.[2] "It frequently happens that after shooting one from a tree, you will find it busted by falling on the ground; they are remarkably tame, and if alarmed, generally take to a tree, especially if disturbed by a dog. I found my air gun of great use in shooting this game, for if there were five or six of them in one tree, I was always sure of bringing them all down," and at Cedar Bluffs on the Mississippi, he praises this weapon as follows: "my air gun which had been charged a few hours before for the purpose of shooting at a flock of wild turkeys, was worth a dozen common guns at a moderate distance."

Quite frequently we find the wild turkey is hunted on horseback. Anburey, on a journey to Richmond, Va., overtakes[3] "a flock of wild turkeys; a couple of spaniels we had with us pursued them, and it is incredible how swift they run, as neither of us, though we galloped our horses, could overtake them, although they run near two hundred yards before they took flight; they appeared considerably larger than ours, and I am told, sometimes weigh thirty or forty pounds each." In the southwestern country 1849, Marcy reports one chase by horses in this manner:[4] A hunter "discovered a turkey upon the prairie, and putting spurs to his horse started after him at full speed. I thought this a novel method of hunting wild turkeys, and looked on the chase with a good deal of interest, particularly as I knew that the quality of our supper depended upon the result. The turkey was about a half a mile ahead at the start, and made good running for a short time, but soon found it necessary to resort to flight. The hunter followed on till the turkey alighted

[1] Godley, John Robert. Letters from America. 2 vols. London, 1844. Vol. I., p. 247.

[2] Schultz, Christian. Travels on an Inland Voyage through the States of New York, Pennsylvania, Virginia, Kentucky and Tennessee, etc. N. Y. 2 vols. Vol. I, p. 122, 123; II, p. 4.

[3] Anburey, Thomas. Travels through the Interior Parts of America in a Series of Letters. 2 vols. London, 1789. Vol. II, p. 342.

[4] Report of Capt. R. B. Marcy's Route from Fort Smith to Santa Fe. 31st Congress, 1st Session, U. S. Senate, Ex. Doc. No. 64. July 24, 1850. Washington, D. C. p. 176.

and ran into a timbered ravine; he still followed out of sight with his horse, but soon appeared again with a stick driving the exhausted bird before him. I expressed much surprise at the facility with which he run down and caught the turkey; but he informed me that they seldom ever fly more than twice before they become exhausted and are easily taken."

One of the most profitable methods is the so called trap or pen, more generally used in Virginia than in any other region. Bruce (l. c., p. 213) in speaking of Virginia in the 17th century writes that "among the ingenious devices employed for its capture was the large trap built in the midst of the forest; lured by a long train of grains of corn to the hole in the ground which led into the trap, where there was piled up a quantity of the same grains, the turkey entered unhesitatingly, and once in, was too stupid to find its way out of the same hole again." Beverley informs us[1] "There are many pretty Devices besides the Gun, to take wild Turkeys; and among others, a Friend of mine invented a great Trap; wherein he at times caught many Turkeys, and particularly seventeen at one time; but he could not continue it so, as to let others in, after he had entrapped the first Flock, until they were taken out." Anburey (l. c. Vol. II, pp. 340, 343) notes this same practice in Virginia. "Just before we came to Goochland Courthouse, we saw the manner by which the inhabitants catch them: they make a long fence of about twelve feet square, securing the top with heavy logs, but before they covered it over dig a passage from the center, to the outside of the fence, which is covered over so as to admit light, and round about the entrance, and through this passage they strew Indian corn, as well as a quantity for them to feed on when in the trap, the birds seeing the corn in the inside, keep walking around to gather it, till they meet that which is laid to conduct them into the passage, which having consumed, they keep eating on till they get into the trap, and these foolish birds, when they wish to get out, instead of returning the way they came in, keep continually flying up, by which means one or two out of the flock, in the morning are found dead, and they frequently catch a flock of ten or a dozen at a time in this manner." In 1819, Warden (Vol. II, p. 178) practically repeats the above for Virginia.

[1] Beverley, Robert. The History of Virginia. London, 2 edit. 1722, p. 252.

Of Ohio in 1814 and 1815, Walker writes[1] "Wild Turkeys are very plenty. I have often set a square pen made of rails, then scattered a little corn about it and into it, and caught eight or ten fine ones at a time. The pen being covered at the top the turkeys could not fly out, and they never thought of ducking their heads to get out by the same passage they came in." In Michigan, about this same period, the pen has this description: (Tibbits, J. S., l. c., p. 404) "The wild turkey is sometimes caught in pens made of poles, some five or six feet in height and covered over the top to prevent their escape. A covered passageway is made under the pen large enough for the turkeys to crawl through. Corn or other grain is scattered in the passageway inside the pen. The unsuspecting birds, seeing the grain, commence picking it up, and thus one after another crawl through the hole into the pen. 'Once in, forever in,' for they never think of putting their heads down to crawl out again."

When at the Mammoth Cave, Blane, (l. c. p. 277) an English gentleman finds, "The manner in which great numbers of wild turkeys are caught is very simple and curious. A Pen is made by placing rough hewn rails one above another, so as to form a vacant space, about six or eight feet long and as many broad, which is closed at the top by heavy rails laid across. A small trench is then dug for a yard or two on the outside and continued under the lowest rail into the interior. In this trench some Indian corn is strewed, and the turkeys, while employed in picking it up, advance with their head downwards into the Pen. As soon as they find themselves in the enclosure, these stupid birds never think of stooping down, or they could walk out as easily as they walked in; but instead of this they try to force a way out at the top and sides, and continue jumping about in great alarm, till some one in the course of the day visits the Pen and secures them. I have known as many as seven or eight caught within four and twenty hours in a single Pen."

In Canada the same method used to be in vogue. Smith finds[2] a "common mode of capturing them is by trapping. This is effected by erecting a large pen or hut of fence rails, leaving the lower rail of one side a sufficient height from the ground to allow of

[1] Walker, Chas. N. History of Athens, O. Cincinnati. 1869, p. 431.
[2] Smith, W. H. Canada; Past, Present and Future, etc. 2 vols. Toronto. 1851, Vol. II, p. 405.

the Turkey creeping under it. A long train of barley, corn, or some other grain is then laid on the ground, leading into the trap; the Turkeys gather up the grain till they arrive at the trap, when they follow the bait and creep under the rail; as soon as they discover the predicament they are in they become so alarmed that they appear at once to lose all instinct; there is nothing to prevent them leaving the trap the way they came in, but they seem to not be aware of that, and remain stupidly staring about them till they are captured. In consequence of this known stupidity of the Turkey, trapping is prohibited in Canada, as tending to exterminate the breed, the Turkey usually wandering in flocks or families, and the whole flock being thus generally taken at once; whereas, if they are *shot*, the chances are that some one of each brood will escape."

SOME WINTER BIRDS OF OKLAHOMA.

BY WELLS W. COOKE.

LESS has been published about the birds of Oklahoma than about those of any other state in the Union. It seems advisable therefore that a record should be made of the notes made during a seven months' residence there the winter of 1883–4. The center of observations was the town of Caddo, on the M. K. and T. Ry., twenty miles north of Denison, Texas. The country at that time — the Choctaw Nation — was devoted principally to the grazing of beef cattle. Right in the town of Caddo there were a few small cotton and corn fields, but a half mile in any direction brought one to the open range, never as yet overstocked, and scarcely changed from its condition before it was trod by the white man's foot. Much the same could be said about the timber. There were no forests anywhere and no evergreens. The country as a whole was well grassed prairie, but every little 'branch' was fringed with brush, and when enough of these had united to make a permanently flowing stream its banks were lined with a thin fringe of trees, which

widened as the stream enlarged until it became a bottomland of tall fine hardwood timber. Such a bottomland existed six miles south of Caddo along the Blue River and many of the observations here recorded were made in this timbered area. It had never been lumbered and the few enormous black walnut logs that had been marketed — logs so large that twelve yoke of oxen were required to haul a single log — had made no impression on the tract as a whole. In fact the conditions, so far as land birds were concerned, were the same as though the country had never been settled — making it all the more desirable that bird notes made at that time should be published for comparison with conditions as they exist today.

The writer reached Caddo August 27, 1883 and left there April 8, 1884. Although bird observations were a side issue, yet close watch was kept of the ever shifting bird population, several hundred birds were collected for purposes of identification, while a bird diary extending over more than eighty foolscap pages serves as the basis for the following notes.

Migrating birds were present during the first week of September; Barn Swallows and Nighthawks passed each evening and September 10, Tree and Cliff Swallows with Cowbirds were common in migration. Other duties prevented a visit to the heavy timber of the bottomland during the whole of the fall and the notes to the end of November pertain to a strictly prairie country, but it seems probable that September 14–21 was the height of the fall migration of warblers. September 15, first rain, ending a dry spell that had lasted since the middle of June; September 21, first ducks of the season — a flock of Mallards. Scissor-tailed Flycatchers, Swallows, and Nighthawks continued to drift by the last ten days of September and disappeared early in October. Meanwhile Cowbirds and Mourning Doves had gradually increased until by October 10, the former were in flocks of 100–150 birds, and the latter were at least five times their September numbers. On this last date the first flock of Canada Geese appeared and flocks of Flickers began to pass in migration. October 15, first large flock of Meadowlarks, about 150, drifting southeast; October 26, first flock of Horned Larks; November 3, first flock of Robins.

By November 6 the Brewer's Blackbirds and Purple Grackles

which came in late October had increased until they and the Cowbirds were present in multitudes. The first week in November brought the first visitors from the north of the Tree, Song, White-crowned, and Harris's Sparrows, Junco, Myrtle Warbler, and Ruby-crowned Kinglet.

The trees had shed about half their leaves by November 9, the first norther of the season November 13 froze water slightly and stripped off many more, while a real norther November 26 tore off most of the remainder.

The first hard rain of the season, December 3, marked the beginning of the wet season; the 'tanks' were filled for the first time since July, and December 13, the lowlands were half-flooded by a down pour. A norther and everything frozen December 19; a temperature of 74° on December 23 and freezing the next day; real winter from December 24 to January 27, with zero weather on January 5 and + 4° on January 24.

The Longspurs began to arrive November 17 and increased November 26; after the hard freeze of December 19, the most common birds were the Junco, Tree Sparrow, and Brewer's Blackbird. All through December the Cowbirds, Red-winged Blackbirds and Meadowlarks gradually decreased until by Christmas they had ceased to be conspicuous. The lowest ebb of bird life was December 24–January 15; after that date, in spite of the cold, Blackbirds began to increase until by January 20, both they and the Horned Larks had doubled in numbers.

McCown's Longspur came January 19; the first spring song of the Meadowlark was heard January 21; still further increase of Blackbirds on January 23, followed by Cowbirds two days later. First spring songs of Red-winged Blackbird and Song Sparrow January 29, when spring began with a rush, the temperature rose to 72° and in two days more there was no snow, ice, or frost anywhere. On January 31 there was a fine chorus of song from a dozen different species, while the Mallard and Green-winged Teal returned to the tanks and a few flocks of ducks passed north. Within the next few days the grass started and the Spring Beauty opened its blossoms.

February 6–14, a second winter.

Savannah Sparrows, Horned Larks, and Smith's Longspurs were

abundant February 13, and the next day appeared a flock of not less than a thousand Lapland Longspurs. Innumerable Savannah Sparrows were present February 16, with the first Chestnut-collared Longspurs and Le Conte's Sparrows. By February 18, the latter were present in hundreds, while the Longspurs, Savannah Sparrows and Horned Larks showed a decrease. The remainder of the Longspurs and Horned Larks with all the Le Conte's Sparrows left the night of February 19, with the Red-winged Blackbirds and Savannah Sparrows showing much decrease.

The woodland birds on February 23, showed not much change from their November condition, except an increase of Field, Song, and Fox Sparrows. On February 26, Robins, Red-winged Blackbirds, Brewer's Blackbirds and Cowbirds were common in migration and a flock of Sandhill Cranes went north at an immense height.

Real spring began March 5, with a maximum temperature of 79°, the arrival of the Purple Martin, and with a 'cloud' of Red-winged Blackbirds. The bulk of Juncos and Harris's Sparrows departed the night of March 9, but were replaced March 15 by large flocks of Fox, Harris's, and Savannah Sparrows and Brewer Blackbirds.

The least bird life since February 1 was on February 22, though at this date Savannah Sparrows were very abundant, but left in the next 48 hours. In the woods on March 25 Ruby-crowned Kinglets and Blue-gray Gnatcatchers were common. At the end of the next ten days a few Savannah and Lincoln's Sparrows were about all that were left of the winter visitants. During these days there occurred the principal migration of Shorebirds, Greater Yellowlegs and Upland Plover being especially abundant, while vast numbers of Sandhill Cranes passed north during the day.

I left Caddo April 8 and made no bird notes after April 4, at which date the migration of warblers and of the more common summer birds had scarcely begun.

1. **Podilymbus podiceps.** PIED-BILLED GREBE.— Not rare as a migrant, spring and fall; one September 22, 1883; most likely to be found on the 'tanks' which were so small and shallow that the birds had scant chance to use their powers of diving and long distance sub-surface swimming.

2. **Anas platyrhynchos.** MALLARD.— One of the few ducks which remained through most of the winter. It was seen September 21, being

the first duck of any kind to arrive in fall migration on the tanks. Ducks were never common owing to the entire lack of marshes and permanent water. When everything froze in January all ducks were forced to leave the open prairies, but mallards were found along the Blue, January 12 and they returned to the tanks January 31, at which time a few flocks of ducks began to pass in northward migration.

3. **Chaulelasmus streperus.** GADWALL.— A few flocks were noted in the spring migration from February 19 to April 2.

4. **Mareca americana.** WIDGEON.— The first flocks in spring were seen February 19.

5. **Nettion carolinense.** GREEN-WINGED TEAL.— The hardiest duck next to the Mallard. It was seen in the fall October 6, and remained in small flocks until all the ponds froze in January. It returned in a few days and had already become fairly common moving northward by January 31. A flock was seen April 2.

6. **Chen hyperboreus hyperboreus.** SNOW GOOSE.— Probably no Snow Geese wintered near Caddo, for they were not seen until spring migration was well under way. Then on March 10, two large flocks were seen flying north and they immediately became common, five large flocks being seen in the afternoon of the same day.

7. **Branta canadensis canadensis.** CANADA GOOSE.— The first goose was seen in fall migration October 10, and for the rest of the fall the species was common flying over toward the south. None alighted near Caddo, but some must have wintered not far off for they were seen every few days all winter. The winter of 1881–2, geese were extraordinarily abundant near Caddo and hundreds were shot for their feathers, the bodies being thrown away. The next winter they were rare and the same during the winter of 1883–4. But this latter winter they were numerous a hundred miles west of Caddo. Canada Geese were common March 3, 1884, migrating north against a strong wind, and flocks passed daily March 9–16. A hard thunderstorm broke at 11 P. M. April 1, and a flock of geese overtaken by the storm, alighted in a dooryard at the edge of town. Hunters say that this is later than usual for them to be present.

8. **Ardea herodias herodias.** GREAT BLUE HERON.— Three were seen February 11, but they probably had not wintered in the immediate vicinity as they are reported to remain only in the mildest winters and that of 1883–4 was anything but mild. Not seen again until the regular spring migration began on March 18.

9. **Grus mexicana.** SANDHILL CRANE.— Naturally a bird of the open country, the sandhill crane was a common migrant both spring and fall at Caddo. The first, a flock of five, passed over November 6, followed on November 11 by three large flocks that flew over southward with much noise in the middle of the day. This was only two days before the first norther of the season carried the temperature below freezing and brought down many leaves. The cranes did not return until February 26, when a flock of sixteen went slowly north in the late afternoon at an immense

height. Several flocks passed March 3, 16, and 22, and vast numbers dotted the prairies and passed north in large flocks April 1–4.

10. **Rallus elegans.** KING RAIL.— A single bird shot November 1 constituted the only record for this species, which could find scant accommodations to its liking around Caddo.

11. **Gallinago delicata.** WILSON'S SNIPE.— Never common; a few scattered birds were seen from October 16 to November 6; the first spring migrants appeared March 8; and they were present in some numbers March 12.

12. **Totanus melanoleucus.** GREATER YELLOW-LEGS.— Seen in small numbers March 11 and March 25, and they became common April 4.

13. **Actitis macularia.** SPOTTED SANDPIPER.— There was no suitable country to tempt the migrant Spotted Sandpipers to alight and they were found only a few times in small numbers, October 1–16.

14. **Charadrius dominicus dominicus.** GOLDEN PLOVER.— Not nearly so common as was to have been expected; a few were reported March 12 and a single one seen March 25.

15. **Oxyechus vociferus.** KILLDEER.— The killdeer of course nested near Caddo and was easily the most conspicuous member of its family. It was noted all the fall, but was most common October 1, after which time the numbers became gradually less until by November 6 nearly all were gone; the last was November 9. A single one was seen February 22, but not many appeared until a week later. By March 5 they had become common and noisy and were most numerous March 15.

16. **Colinus virginianus virginianus.** BOB-WHITE.— Abundant resident; favorable conditions for both food and shelter existed along every little branch and the number of covies was correspondingly great. No better quail hunting could be found anywhere than existed the early winter of 1883 along the edges of the bottomland of the Blue River. The Red-tailed Hawks however seemed to be fully as destructive to the quail as the sportsmen and by Christmas the covies had become seriously reduced.

17. **Tympanuchus americanus americanus.** PRAIRIE CHICKEN.— The open country around Caddo was especially adapted to the needs of the prairie chicken and they were one of the common birds. Some 18–20 covies were reared within a radius of a mile of the town and by September 24, these had begun to unite into larger flocks. At least a hundred were seen in one small field November 6. In the early fall while they were in the original covies, they would lie well to a dog and gave good sport. As the flocks became larger the birds became much more wary until by early December it was difficult to get within even rifle shot. Each flock had sentinels posted on commanding elevations, and when these gave the alarm the whole flock was off and seldom flew less than half a mile before alighting.

18. **Meleagris gallopavo silvestris.** WILD TURKEY.— Very common in the bottomlands a few miles from Caddo. On November 5, twelve large ones were brought into town as the spoils of a forenoon hunt by one party.

19. **Zenaidura macroura marginella.** WESTERN MOURNING DOVE. — In the late summer and early fall, the mourning dove occurred everywhere in single birds and pairs. By September 10, they had begun to gather in small parties, and soon after this it was evident that their numbers were being increased by arrivals from the north; from September 28 to October 9 they were at least five times as numerous as the summer population. During the dry spell from September 10 to October 1, they visited the tanks in large numbers every evening, but as soon as the rains came they spent the nights on the tops of the hills. By the first of November all the large flocks had gone and only a few scattered birds remained. The last one seen was November 29, but they were reported occasionally throughout the winter and returned in spring migration February 23, though in the spring they were far less common than in the fall.

20. **Cathartes aura septentrionalis.** TURKEY VULTURE.— An abundant summer resident and equally common throughout the winter. In fact this species and the Black Vulture were so numerous that in the fall and early winter when cattle feed was good and dead animals were few, these two species had hard work to get a living. They could be seen sailing overhead in great flocks seeking for food, or sitting in long lines on the fences. An animal killed in the morning would be picked clean by night and there was great quarreling with some fighting over the carcass. After the snows and freezing rains came cattle began to die by the hundred, and before spring more than 15,000 died within 30 miles of Caddo. Then, particularly in March, scarcely a Vulture was ever seen in the air. They became so particular that they would not touch a carcass on the prairie, but selecting those that had fallen in or near timber, would gorge themselves, fly heavily to the nearest tree and stay there until there was room in their bodies for more of their disgusting food.

There seemed to be considerable increase in the numbers of the Turkey Vulture during October, especially October 18–20, and probably this is the time that migrants from the north arrived.

21. **Catharista urubu.** BLACK VULTURE.— Common resident and though varying in numbers from week to week, this variation is probably due to wanderings in search of food rather than to any real migration. Its numbers were on the whole somewhat less than those of the Turkey Vulture; usually both species flocked together, but on January 16 a flock of 27 was seen composed entirely of Black Vultures.

22. **Elanoides forficatus.** SWALLOW-TAILED KITE.— Common both in migration and in summer. The first arrived in the spring April 1.

23. **Circus hudsonius.** MARSH HAWK.— The most common winter hawk, indeed they were twice as numerous at Caddo during the winter of 1883–4 as all other hawks combined, and were in the proportion of about three brown-colored to one blue individual. In the spring they fed largely on Blackbirds. They were seen many times to try to catch smaller birds, but always failed.

24. **Accipiter velox.** SHARP-SHINNED HAWK.— A not rare winter resident; seen January 12 at the Blue River.

25. **Accipiter cooperi.** COOPER'S HAWK.— A winter resident, seen for the first time in the fall on September 17.

26. **Buteo borealis borealis.** RED-TAILED HAWK.— A common winter resident; as many as eighteen were seen Christmas day near the Blue River.

27. **Haliaeetus leucocephalus.** BALD EAGLE.— A winter resident along the Blue River; seen there January 12.

28. **Falco sparverius sparverius.** SPARROW HAWK.— One of the commoner hawks through the winter and probably a resident. It was seen September 22 and by March 3 most of the wintering birds had departed and only three individuals were seen from then to March 15. On November 7 a Sparrow Hawk was seen chasing a Shrike — dog eat dog.

29. **Strix varia varia.** BARRED OWL.— Resident and the commonest owl or at least the one most in evidence. The pellets thrown up at one time by an individual of this species contained parts of a Brewer Blackbird, a Cardinal Grosbeak and a Le Conte Sparrow.

30. **Otus asio asio.** SCREECH OWL.— A common resident.

31. **Speotyto cunicularia hypogaea.** BURROWING OWL.— Does not occur right at Caddo, but is a common resident thirty miles to the northwest.

32. **Conuropsis carolinensis.** CAROLINA PAROQUET.— According to the early naturalists, this species was formerly abundant throughout much of eastern Oklahoma. A sharp lookout was kept for it every time that the timbered districts were visited, but none was seen. A stuffed one was still preserved that had been shot near Caddo several years previous. In 1882 a large flock was seen about 18 miles from Caddo; other smaller flocks were reported from time to time, the last being January 15, 1884 on the Blue River about eight miles from Caddo. They were, of course, resident.

33. **Ceryle alcyon alcyon.** KINGFISHER.— Resident, though not so common as in many other parts of the country.

34. **Campephilus principalis.** IVORY-BILLED WOODPECKER.— Resident and not considered by the local hunters as any great rarity. Seen on two visits to the heavy timber of the Blue River — November 29 and January 12.

35. **Dryobates villosus villosus.** HAIRY WOODPECKER.— Common resident.

36. **Dryobates pubescens pubescens.** DOWNY WOODPECKER.— Common resident; these two woodpeckers were about medium in numbers as compared with the other species, exceeding the Yellow-bellied and Red-headed, and being exceeded by the Flicker and the Red-bellied Woodpecker. On January 12 about a dozen were seen in two miles along the Blue River; they were already beginning their spring drumming.

37. **Sphyrapicus varius varius.** YELLOW-BELLIED SAPSUCKER.— Rare winter resident; seldom more than one seen in a day's tramp. It was not seen in the fringes of timber along the branches, but was found every time the heavy timber of the Blue was visited.

38. **Phlœotomus pileatus pileatus.** PILEATED WOODPECKER.— In the larger forested areas of the river bottoms, a fairly common resident.

39. **Melanerpes erythrocephalus.** RED-HEADED WOODPECKER.— A winter resident and one of the rarest Woodpeckers. A party of eleven flew over town September 12, evidently in migration, and two more passed by September 18, flying at a great height. A very few were present all winter in the timber along the Blue.

40. **Centurus carolinus.** RED-BELLIED WOODPECKER.— Resident and the most abundant Woodpecker near Caddo; some 50–60 were seen November 29 in a three-mile walk along the Blue River.

41. **Colaptes auratus auratus.** FLICKER.— None were seen until migrants began to appear September 18, but it does not follow that the species could not have been found earlier had the heavy timber been visited. No more migrants seen until October 14 when they became common. Through the winter along the Blue they were next to the Red-bellied in numbers, being most common the last of November and less than half as common in the middle of the winter. They were still present in fair numbers March 15, but by March 25 had nearly all departed.

42. **Colaptes cafer collaris.** RED-SHAFTED FLICKER.— A fine male was collected January 11, being the first one seen. None of the local hunters to whom it was shown had ever before seen a Flicker with red wings, so it evidently is an uncommon visitant to the district. The next day it was found fairly common near the Blue and when this form and *auratus* were heard calling alternately as happened several times during the day, the note of *collaris* was so much coarser, rougher, and heavier as to be instantly distinguishable. The so-called *hybridus* was also noted at the same time and place and both forms remained common the rest of the winter.

Thus at Caddo, *auratus* arrived early in the fall and was a common winter resident; few, if any, bred there. After *auratus* had practically completed its fall migration and settled down to winter numbers, *collaris* and *hybridus* came in together, and during the coldest weather all three were found in about equal numbers in heavy timberland, though *collaris* was perhaps the most abundant. All three forms were still present March 15, but *collaris* and *hybridus* left a few days later.

43. **Chordeiles virginianus** subsp.? NIGHTHAWK.— A few were already present the first of September but whether or not they were summer residents could not be told. By September 9 southward migration was well started; an increase was noticeable September 18 when they were most common. Their numbers slowly decreased and the last was seen October 10.

44. **Archilochus colubris.** RUBRY-THROATED HUMMINGBIRD.— Seen only twice, one bird each day, October 7 and 8.

45. **Muscivora forficata.** SCISSOR-TAILED FLYCATCHER.— A common breeder, scattered over much of the country; gathering in flocks September 11; moving southward in the early evening September 14; the

height of fall migration was September 20–22, the flocks seeming to start for their night's journey, just before dark. The morning of October 6 a flock was seen which had arrived during the previous night; they were very restless, were not feeding, left during the day, and were the last seen. The next spring they appeared at Caddo, April 11.

46. **Tyrannus tyrannus.** KINGBIRD.— Though of course the Kingbird must nest in that general region, none were seen until September 10 and then only three birds. Two more were seen the next day and four on September 14. This completes the record for the whole fall.

47. **Sayornis phœbe.** PHŒBE.— A rare migrant and still rarer winter resident. None were seen until three birds in migration October 18, paused for a few minutes in town and then hurried on southward. No more were seen in town but a few spent the winter in the heavy timber whence they appeared March 8, March 15, and again March 25.

48. **Otocoris alpestris praticola.** PRAIRIE HORNED LARK.— The appearance of a large flock October 26, marked the arrival of this species in its winter quarters. They soon became common and remained in fairly constant numbers until the real winter of January when they doubled their former numbers. When the earth was covered February 13 with a half inch of fine frozen sleet, the Horned Larks seemed to be having a hard time to get a living. The air was full of swiftly flying flocks that alighting only to start again before the last straggler had fairly touched the ground. A decided decrease was noticeable February 18 and two days later not a bird was visible in the fields where they have been common all winter. Others in less numbers soon came to take their places and about March 8 the flocks broke up and the few remaining birds were seen in pairs.

49. **Cyanocitta cristata cristata.** BLUE JAY.— None were seen until on October 18, a flock of 18 passed over flying south; seen again October 25. No more were noted until the timber along the Blue River was visited November 29; there they were found abundant, in fact they were everywhere and kept up a constant shower of acorns falling on the dry leaves. At least 150 seen in a three mile walk. At one time when passing through a grove of trees which had no acorns not a Jay was visible. Some of the heavier woods near the smaller streams were visited December 25, and no Blue Jays were seen. The part of the woods where they were most abundant on November 29, was visited again January 12, and less than a dozen were seen and scarcely a sound heard. The same conditions were found on a subsequent visit February 23, and much the same when another similar stretch of bottomland was visited March 25.

50. **Corvus brachyrhynchos brachyrhynchos.** CROW.— In early September, the Crows were scattered singly over the country and probably represented the birds that had spent the summer in the vicinity. By September 22, they began to show a decided increase, and then remained constant in numbers for the next month; after that, they decreased until during the coldest part of the winter only a few were seen.

51. **Molothrus ater ater.** COWBIRD.— Already common by Septem-

ber 1, in flocks containing both males and females; from September 26, to October 9, these flocks increased in size until they contained 100–150 birds in a flock. The increase continued for the next month until by November 2, they were present in multitudes swarming over the cornfields and around the barnyards. Then they decreased rapidly and only a few were seen after November 15. These few remained through the winter and on January 6 seemed to be nearly through with the winter molt. The first male in full spring plumage was seen January 17 and two days later there was a marked increase in numbers, about half the birds being in bright black plumage.

The bulk of male cowbirds began to arrive about January 22 and they were common for a month and then about February 20, they seemed to pass on north and after a few days their places were taken by new flocks from the south composed mostly of females. They were never common in the spring as in the fall and their spring numbers at the most formed only a small fraction of the mixed Blackbird flocks. Few were seen after the first of March, and a single one March 23 was the last.

52. **Agelaius phœniceus** subsp.? RED-WINGED BLACKBIRD.— The first flock appeared September 10, the species was not yet common by October 9, and even by November 6, not more than ten flocks had been seen in all. Two days later they became more common and by November 16 they were abundant and equal in number to the Brewer's Blackbird. These mixed flocks gradually decreased until by December 25 there were few flocks of more than a hundred birds. Yet these small flocks were scattered so numerously over the country as to make the Blackbirds among the most numerous species. The last of December the females of the Red-winged Blackbird were hardly a tenth as numerous as the males. On January 22 the first increase over winter numbers was noted; still further increase January 29 and the first spring song. Several flocks were passing north in migration February 16, and by February 20 quite a share of the birds had passed on north. More flocks flew by heading north February 25, still principally males, though a few females were seen February 26 and about a tenth of the flocks on this date were young males. On March 1 it was noticed that the local flocks feeding around town during the day, were flying to the woods for the night. Nothing of the kind was seen during the whole of the winter, the birds keeping all the time in the open country away from the timber. A cloud of Red-winged Blackbirds was seen for the first time in the spring March 5, and on March 11 a similar cloud passed by at noon as though in regular migration. Within a few days they began to decrease and by March 20 had become so rare that for the rest of the month only small parties of 6–10 were seen.

53. **Sturnella magna magna.** MEADOWLARK.— Though probably resident, they cannot have been common in the fall for they were not noted among the large numbers of Western Meadowlarks that swarmed over the country in the fall. It was not until January 11 that this form was certainly identified; by January 31 it was in full song and the songs of the eastern

and western forms could often be heard in the same field. It was fairly common in migration February 16, but was never common as *neglecta* was in the fall, and the migrants passed on north in the course of the next ten days. A few additional individuals on March 8, were the last ones certainly identified.

54. **Sturnella neglecta.** WESTERN MEADOWLARK.— A resident, but much less common in summer than in migration. It began to flock in the early fall and by September 22, these flocks contained 15–20 individuals; the size of the flocks increased until on October 15 a flock of about 150 was seen; a little later the birds were most numerous in flocks of 200–500. Then they rapidly decreased, until by Christmas only a few small parties of 3–6 remained sitting on the fences, silent and disconsolate as if debating whether to continue south or to stay. The first spring song was heard January 21 but there was not much increase in numbers until about the middle of February. These migrants soon passed north leaving few breeders remaining for the summer.

55. **Euphagus cyanocephalus.** BREWER'S BLACKBIRD.— Nearly all the time this was the most abundant Blackbird. That it sometimes nested there was proved by the fact that in early September a scarcely fledged bird was caught that must have been reared in the immediate vicinity. The first flocks came about October 20 and increased so rapidly that by November 6–8 when they were most numerous they swarmed everywhere. Then they gradually decreased until by November 26 they were less than one-third of their highest numbers, but even at this they were as numerous as any other species, not excepting the Juncos and Tree Sparrows. By Christmas the flocks had become still smaller, many small parties of 6–10, were then seen and few flocks of over a hundred birds. The spring 'song' was first heard January 9 and the male that uttered it was also going through the regular feather ruffling and swelling of the mating season. Females at this time were rather scarce and even as late as February 26, when the winter numbers had been somewhat increased by migrants the flocks were still at least three-fourths males. Additional migrants came early in March and by March 15, the Brewer's Blackbird was the most numerous it became any time in the spring. Nearly all left during the next week, and the remainder began to pair.

56. **Quiscalus quiscula æneus.** BRONZED GRACKLE.— Became common October 20, and increased slightly to November 8; then decreased so rapidly that all were gone in the next four days. When most common they were not one-tenth as numerous as Brewer's Blackbird. None seen at any time through the winter, which is rather strange, considering how much farther north this species winters nearer the Mississippi.

57. **Carpodacus purpureus purpureus.** PURPLE FINCH.— A party of about 15, on January 12, were the first seen except a few two days previously; two were adult males in full breeding plumage, but no song was heard from any of them. They never became common, but remained through the rest of the winter until March 18, and were in full song by March 15.

58. **Astragalinus tristis tristis.** GOLDFINCH.— A common winter resident, seen after November 12 in small parties of 6–25 birds. They remained fairly constant in numbers through the winter, the last being seen March 25.

59. **Calcarius lapponicus lapponicus.** LAPLAND LONGSPUR.— None were seen until a sudden cold snap in February covered everything with frozen rain; then on February 13, three were seen; the next day they were present by hundreds if not by thousands. They swarmed everywhere for a week and then on the night of February 19, with a clear sky and a south wind, they disappeared as suddenly as they had come.

60. **Calcarius pictus.** SMITH'S LONGSPUR.— Came November 17, when there was hardly a sign of approaching winter and the leaves had not all fallen from the trees. They became common November 26, when the second norther of the season brought many birds from the north, and they stayed through heat and cold, ice, snow, and rain, until the bulk left February 19 and the last February 26. They did not increase in numbers the second week in February, when the Lapland Longspurs became so abundant, but they were still common on February 19 and the next day not one was to be found. The only birds seen after this date were a few flying north on February 26.

61. **Calcarius ornatus.** CHESTNUT-COLLARED LONGSPUR.— Among the hundreds of Lapland Longspurs that came in February were a few of the Chestnut-collared. The first were seen February 16, less than a dozen in all and they remained only a few days; they were seen again February 18, but on February 20 could not be found nor were they seen again later.

62. **Rhynchophanes mccowni.** MCCOWN'S LONGSPUR. Seen only once, when a flock of 40–50 birds was found February 19.

63. **Poœcetes gramineus gramineus.** VESPER SPARROW.— First identified with certainty in the fall on October 14; flocks were present the rest of the month, but these soon passed on and the few stragglers left disappeared soon after November 9. None were seen through the winter until a spring migrant — a single bird — arrived February 25. No more were seen until March 11, when they became at once common and remained so until March 19; still present March 25, but in greatly decreased numbers.

64. **Passerculus sandwichensis alaudinus.** WESTERN SAVANNAH SPARROW.— Was already common September 7, and remained so throughout the winter, but was much less numerous during the coldest weather than either fall or spring. A decided increase was noted on February 13, and the next day the birds were common, scattered in parties of five or less all over the fields; two days later their numbers still further increased, only to decrease in another two days and to diminish by at least one half in two days more. They became rather uncommon the last week in February, but were common again March 3 and abundant by March 11. On March 21 the Savannah Sparrows outnumbered in the open fields all other species combined, and were still more common the next day, when in a single field there were certainly not less than a thousand, and probably over two

thousand, individuals. They could be seen and heard on all sides all the time. The next day the numbers remained the same, while the day following a walk over the same ground revealed two birds only. A few were still present when the observations ceased April 4.

65. **Ammodramus savannarum bimaculatus.** WESTERN GRASSHOPPER SPARROW.— Though of course it had been present long before, it was not identified until October 29, and was common November 5. It left soon after, and was so rare through the winter that the total record was two birds December 25, one February 9, one a week later, and one March 1. The first spring migrants arrived March 3.

66. **Passerherbulus lecontei.** LECONTE'S SPARROW.— Though undoubtedly wintering not far distant, it was not seen at Caddo, until a dozen or more were noted February 16. Two days later it was abundant in all the open fields, most of these birds leaving the night of February 19; two individuals on February 26, were the last seen.

67. **Chondestes grammacus strigatus.** WESTERN LARK SPARROW. — Was common September 1, scattered singly over the fields and roads and had evidently been there all summer. It left by September 10, and had not yet returned when the observations closed the first of April.

68. **Zonotrichia querula.** HARRIS'S SPARROW.— The first seen were two in town November 8, one with black head and throat patch, the other with no black feathers. Several were seen November 16 and a small party November 26. In the bottomland along the Blue River November 29, not a one was seen, but in the bushes fringing the smaller streams, they gradually became more common until by Christmas they had become the most common species. They were in small parties scattered along the branches and would keep flying ahead of a person until several of these parties had united to make a flock of 40–50 birds. On December 25, about one male in a dozen showed the black head and jet black throat, while half of the rest began to show black feathers among the brownish ones of the throat and breast.

They were least numerous from about January 15 to February 23. Up to February 18, no real black-headed bird had been seen in the spring, though all were showing black feathers on the crown. By March 1 some of the males were in full plumage. By February 26 they had become common again in their northward migration showing that many winter to the south of Caddo. These returning birds spread over the country more than did the winter residents and on March 5 a large party was seen feeding on the ground in a barn yard on the prairie.

On January 3, they began to appear in town, and on January 7 when some bird seed was thrown out near the house, a party of some 20 Harris's Sparrows almost monopolized the free lunch. Harris's Sparrow had two notes, one a clear whistle something like that of the White-throat, and the other a queer chuckle, while a few days later a third note was distinguished like one trying to say 'chink' and 'peep' at the same time.

By the middle of January the three Zonotrichias had settled into their

regular numbers; the White-crowned was the least common and was found almost entirely in weed patches in town and on the edges of the prairies; the Harris's Sparrow came next in numbers and most of them kept in the thickets along the small streams, a few coming into town and still fewer into the heavy timber; the White-throated, the most common of all, kept strictly to the bottomlands.

The Harris's Sparrows remained abundant all winter and on February 23 a few were found in the heavy timber, though still keeping for the most part to the borders of the woods.

The bulk of the winter residents departed the night of March 9, but their places were taken immediately by migrants from the south in such numbers as to make the species on March 15 more common than it had been any time through the winter. But they left as quickly as they had come, and a single bird seen March 25 was the last.

69. **Zonotrichia leucophrys leucophrys.** WHITE-CROWNED SPARROW.— A single male in full dress November 9 was the first noted. The numbers increased gradually until by November 29 the species was common along the brushy streams near Caddo, but on that day was found in small numbers only, in the heavy timber along the Blue. A norther on December 19, froze everything solid and brought an increase of White-crowns, but these continued south soon afterwards and by December 25 the species was rare. It remained so the rest of the winter; it was present all the time but seldom more than two or three seen in one day. There was no increase of numbers as spring opened and the last was noted on March 11.

70. **Zonotrichia albicollis.** WHITE-THROATED SPARROW.— This was one of the most abundant birds in the woods throughout the winter. It was not noted near Caddo during November, but when the heavy timber was visited for the first time on November 29 it was found to be the most common bird there, and evidently must have come several days earlier. It was scattered through the woods in parties of 10–25 birds, most of the flocks being of the former size; several hundred birds in all were seen. Though the numbers decreased somewhat during December and January, yet it continued to be the most common sparrow in the woods through the whole winter and to February 23. During all this time not one was seen in town, where all the other sparrows came frequently, but on March 5 its clear spring song was heard in the village. By this time the bulk had left, and on March 25 the last one was noted.

71. **Spizella monticola monticola.** TREE SPARROW.— The first were noted October 31, but they had probably arrived with cold snap of a few days previous. They had increased by November 6 and after the norther of December 19, they became one of the commonest birds. In the fields and along the edges of the woods they were more common even than the Junco, but in the heavy timber they were outnumbered by the White-throated Sparrow. By throwing some bird seed on the south porch of my house January 7, we had a whole colony of sparrows in plain sight right under the window. A party of some twenty Harris's Sparrows almost

monopolized the free lunch, but one bright Cardinal came occasionally, with a few White-crowns in plain brown head-gear, while the still more humble Tree Sparrow made up for its lack of beauty, by keeping steadily at work and devouring more seeds to the minute than any of the others.

The numbers of the Tree Sparrow remained unchanged through the rest of January and to February 26. They seemed to have decreased by March 1, and the bulk probably left the night of March 9; by March 11, only a few were left and none were seen after this date.

72. **Spizella passerina passerina.** CHIPPING SPARROW.— Should be a breeding bird at Caddo, but none were noted until late in October, and even by November 6 not many had been seen. The species never was common, and although a few were seen in December and January it was a decidedly rare bird through the winter. Spring arrivals had not yet been noted the first of April.

73. **Spizella pusilla pusilla.** FIELD SPARROW.— Seems not to breed at Caddo for none were seen there until several appeared on October 6, from which time they increased slowly for the next month, until they became fairly common and then remained so throughout the entire winter. With the opening of spring February 20–23, migrants from the south caused a notable increase, but these passed on almost immediately taking with them the winter visitors and before March 25 all had left.

74. **Junco aikeni.** WHITE-WINGED JUNCO.— On February 21 one was shot in my yard in town which was a perfectly typical specimen of this form in its highest and brightest plumage. It was in company with a second, and had been seen several times previously since its first appearance February 14. A single one seen March 7 completed the winter's record.

75. **Junco hyemalis hyemalis.** SLATE-COLORED JUNCO.— A single bird appeared October 25, but no more were seen until a small party came November 7, followed November 16 by a further increase. They became common November 26 after the second real norther of the season. After the next norther December 19, that froze everything solid, the Junco became one of the commonest birds of the prairie. It was still common December 25, but much less than the previous week and it soon still further decreased until, during January and February, while not exactly rare, yet it was far from common and remained so until its ranks were swelled by spring arrivals February 23. The largest flocks of the whole season were seen March 1, the bulk of these birds departed the night of March 9, and most of the remained followed the succeeding night. So completely did they leave that on March 19 only a single bird was seen and another one March 26 was the last.

76. **Melospiza melodia melodia.** SONG SPARROW.— Not only did it not breed at Caddo, but it was not seen there until late — November 6. It would have been expected much earlier, but so conspicuous a bird could hardly have been overlooked. Two days later it had become fairly common, and on November 29 it was one of the common birds found in the heavy timber along the Blue. It was less numerous there a month later,

but still remained all winter among the more common birds. The first full song was heard January 29, and two days later it was a prominent member of a bird chorus from a dozen different species which was as voluminous as one would expect in the height of spring migration. Arrivals from the south were much in evidence March 11 and as in the case of several other of the winter residents, the spring birds passed on within the next few days and took the winter birds with them. No Song Sparrows were seen after the few scattering individuals present March 21.

77. **Melospiza lincolni.** LINCOLN'S SPARROW.— Not noted in fall migration; a single bird seen February 1 and as spring migration had not yet started it had undoubtedly wintered. One was collected February 9, but up to and including March 11, only seven birds had been seen, showing how rare it is during the winter. Then suddenly on March 15, it became common both in town and in the woods, only to leave for the most part in a few days. When the record closed on April 4, it was present in about one-third of its highest numbers.

78. **Passerella iliaca iliaca.** FOX SPARROW.— Not an abundant winter bird but still fairly common, and almost constant in numbers from the latter part of December until spring migrants began to arrive February 23. The first fall arrival was noted December 1 and the last March 15, on which day migrants were abundant only to disappear at once.

79. **Pipilo erythrophthalmus erythrophthalmus.** TOWHEE.— The first was noted October 24, and the species did not become common before the middle of November, but by November 29 it was present in full numbers scattered commonly through the woods along the Blue River, for the most part in pairs of a male and a female, many of the males being as brilliant in dress as ever seen in spring. The numbers decreased by half as the migrants passed on, and left the species rather common through the winter until the migrants returned March 8. The increase of numbers was of short duration, and a long walk on March 15 revealed only three birds while the last was seen March 25.

80. **Cardinalis cardinalis cardinalis.** CARDINAL.— Abundant resident. During the fall, cardinals were found among the thick tall weed patches around the cotton fields; they were silent and so shy that they were seldom seen, sheltering themselves in the almost impenetrable mass of foliage. During the latter part of November, when most of the leaves had fallen, they retreated to the thickets along the streams. Here they stayed in great numbers until real winter when they began to flock into town, and as long as snow lasted they could be found everywhere around the houses where not one had been seen for several months. A dozen Cardinals together, with the snow for a background, made a most striking and brilliant picture.

81. **Passerina ciris.** PAINTED BUNTING.— An abundant breeder at Caddo, but all had left before this record began the last of August and none had as yet returned the first of April.

82. **Spiza americana.** DICKCISSEL.— Quite common September 14,

but none seen later than September 25, and they had not yet arrived the first of April.

83. **Progne subis subis.** PURPLE MARTIN.— Fall migrants had for the most part departed before the last of August, but a few were present the first week in September and the last left September 12. A party of five arrived the afternoon of March 5, but disappeared in a few minutes and did not return until March 11. They were still far from common March 19 and had received no further increase by April 4: evidently not a common bird at any time.

84. **Petrochelidon lunifrons lunifrons.** CLIFF SWALLOW.— During the evenings of the last of August and early September, swallows were in sight almost continuously moving southward. In August the Barn Swallow was the most numerous, later its numbers decreased and the Cliff Swallow became most common. In late August the flight began about 5.30 and lasted an hour; on September 13, the first group passed at 5.10 and the last at 6.10. In addition on September 10, probably a hundred Cliff Swallows were seen during the day circling over the town. At 8 A. M. September 25, about thirty Cliff Swallows passed in one flock going rapidly south; and for the next two weeks Cliff Swallows were seen about one third of the mornings and one half of the evenings, in numbers from five birds to 200, about nine-tenths of them heading straight south and the rest flying about in search of food. The last was seen October 9, and none had appeared the next spring by April 7.

85. **Hirundo erythrogastra.** BARN SWALLOW.— For several evenings the last of August, many barn swallows passed flying westward, probably to spend the night at a lake not many miles distant. Their numbers steadily diminished until by September 13 the Barn and Cliff Swallows were about equally numerous. Three Barn Swallows on September 19 were the last of this species seen, nor had they been seen again by the seventh of April, though on April 1, they appeared at Gainesville, Tex., only a few miles to the southward.

86. **Iridoprocne bicolor.** TREE SWALLOW.— Never common, but a few were seen daily mingling with the flocks of the other swallows, until the last was noted September 13. It also had not appeared by the first of April, though by this time it was already present as far north as Chicago.

87. **Bombycilla cedrorum.** CEDAR WAXWING.— The first birds, a flock of about a dozen, were seen November 29. A few remained through the winter, but they were quite rare and showed no increase in the spring.

88. **Lanius ludovicianus excubitorides.** WHITE-RUMPED SHRIKE.— A resident, and one of the commonest birds; seen almost constantly, sometimes singly, but more often in pairs and sometimes four and five. Its numbers decreased decidedly after the advent of cold weather, but it still remained common through the winter.

89. **Vireo griseus griseus.** WHITE-EYED VIREO.— Never common and had already left before the last of August. Returned March 25 when three were collected and two more seen; all were in full loud song.

90. **Vireo belli belli.** BELL'S VIREO.— A single one collected September 8, was the only bird seen in the fall, and it had not yet come in the spring by April 4.

91. **Compsothlypis americana usneæ.** NORTHERN PARULA WARBLER.— Was not seen in the fall. The first arrived March 25.

92. **Dendroica coronata.** MYRTLE WARBLER.— The commonest warbler in fall, and the only one that remained throughout the winter. The first — a single bird — was seen November 16 along a small stream. Since the species was found very abundant the first time the heavy timber was visited November 29, it probably arrived in the woods somewhat earlier than it was noted on the prairie. The numbers had decreased decidedly by December 25, but still it remained fairly common all winter, though constantly lessening in abundance. It began the middle of March to return to the edges of the prairie, whence it had been driven to the bottom-land during the winter.

93. **Geothlypis trichas trichas.** MARYLAND YELLOW-THROAT.— Three birds seen in all, two September 9 and one the next day; it had not yet arrived the first of April.

94. **Anthus spraguei.** SPRAGUE'S PIPIT.— A flock of 40–50 birds was seen in an open field February 18 in company with Savannah Sparrows, Lapland and Chestnut-collared Longspurs. The next day none of these except the Savannah Sparrows could be found.

95. **Mimus polyglottos polyglottos.** MOCKINGBIRD.— A common breeder in town but by the first of September the birds had deserted their nesting sites and most of them must have migrated, for less than half a dozen were seen during the entire winter. The first full song was heard February 21, but the birds had not yet become common by the first of April.

96. **Toxostoma rufum.** BROWN THRASHER.— One bird on September 8, was the sum total of all seen in the fall. This seems a very early date for it to disappear since at this time it was still present in Minnesota, and it spends the whole winter only a few miles south of Caddo.

Two silent birds were the first arrivals March 8, which is fully as early as they would be expected to arrive, but no more had been seen to April 7, though by this date the species was far north of St. Louis. Evidently the Brown Thrasher was not a common bird at Caddo.

It seems a little strange that not a Catbird was seen at Caddo either in fall or spring.

97. **Thryothorus ludovicianus ludovicianus.** CAROLINA WREN.— Common resident; retiring and silent through the winter, but by February 23, its full spring song was heard almost continually, from various directions and by March 25 it was one of the most conspicuous and noisy inhabitants of the woods.

98. **Thryomanes bewicki cryptus.** TEXAS BEWICK'S WREN.— Not noted until November 8, but it may have been present all the fall in the bottomland; by November 25 had become quite common around town and remained so until about December 19. Then its numbers diminished,

but it was still present all winter. Began to sing February 16, and two days later was in full spring song. All disappeared after March 19, but the people of the town said they would return later and be the common House Wren of the summer.

99. **Nannus hiemalis hiemalis.** WINTER WREN.— Rare both in the late fall after its arrival November 29, and through the winter until the last was noted March 25; never more than three birds seen in one day.

100. **Certhia familiaris americana.** BROWN CREEPER.— Arrived the same day with the winter wren, November 29, and through the winter was scarcely more common, but on February 23 they suddenly appeared everywhere in the heavy timber along the Blue. The wave soon passed on and a few days later all had disappeared.

101. **Sitta carolinensis carolinensis.** WHITE-BELLIED NUTHATCH.— Not noted until the bottomland was visited November 29, though it undoubtedly is resident. A dozen birds were seen and they remained in about the same numbers all winter. None were seen at any time away from the heavy timber. By February 23, they had become noisy, active, and conspicuous.

102. **Bæolophus bicolor.** TUFTED TITMOUSE.— Had not been seen along the small streams during the early fall, but when the heavy timber of the Blue was entered November 29 it was found one of the most characteristic birds. At least a hundred were seen, confined entirely to the trees on the river's edge; not a titmouse was seen even a gunshot away from the stream. They were present in about the same numbers on January 12, but when the same woods were visited February 23, only a dozen were seen where there had been a hundred in November. This must have been merely temporary however, for in March they were just as common as ever, and in this latter month they left the shelter of the heavy timber and were found widely distributed. In November they were noisy, in January silent, and in March striving to relieve themselves of the surplus of noise they had accumulated through the winter.

103. **Penthestes carolinensis agilis.** PLUMBEOUS CHICKADEE.— A common resident, numerous enough so that 30–40 would be seen in a day's walk. It was found for the most part in the heavy timber, but a few wandered into the fringes of small trees along the streams. It was in full song February 23.

104. **Regulus satrapa satrapa.** GOLDEN-CROWNED KINGLET.— When the bottomlands were visited for the first time, November 29, it was already common, and had probably arrived a few days earlier; its numbers were unchanged January 12, but it must have left earlier than most of the winter residents, for when this same place was examined February 23, it had already disappeared.

105. **Regulus calendula calendula.** RUBY-CROWNED KINGLET.— The first came November 7, but it was never common and the last was seen December 9 before real winter arrived. It returned March 25 and was abundant for a few days.

106. **Polioptila cærulea cærulea.** BLUE-GRAY GNATCATCHER.— Probably nested but was not noted until September 10; by that time most of the summer birds had gone, but a few lingered to November 6. No more were seen until, on March 25, they were so common that a full hundred were seen in a three mile walk. One bird was heard to give a long, and beautiful and perfect trill,— a note which was not heard again from a Blue-gray Gnatcatcher, until the spring of 1913 at Washington, D. C.

107. **Hylocichla guttata pallasi.** HERMIT THRUSH.— Two seen November 29, the first day the bottomland was visited. It remained in small numbers through the winter and was last seen March 1, though most likely some birds remained to a later date.

108. **Planesticus migratorius migratorius.** ROBIN.— A flock of fifty flying south at 4 P. M. November 3, was the first of the season; no more were seen until November 29, and then only a few. The number were never great but a few could be found almost any time, and they began to sing January 31. Several were seen February 23, while three days later the numbers had more than doubled. On March 5, a party of Robins was feeding on the ground, strangely enough every bird seen previous to that time had been perched on bush or tree. They were most common March 15, but left within the next ten days.

109. **Sialia sialis sialis.** BLUEBIRD.— Not seen until September 8, though of course it had been present all the time, since it breeds at Caddo, where it is reported to nest in town early in the spring and then spend most of the rest of the year in the thick woods. To November 29 less than a dozen had been seen in all, but on that day they were found common in the heavy timber along the Blue, and they remained so all winter. They became decidedly less numerous after February 23, and none at all were seen during the last week in March.

110. **Sialia currucoides.** MOUNTAIN BLUEBIRD.— Seen once during the fall.

NOTES ON THE BIRDS OF LEON COUNTY, FLORIDA — THIRD SUPPLEMENT.

BY R. W. WILLIAMS.

IN 'The Auk' for October, 1904 (XXI, p. 449) I published a preliminary list of the birds of Leon County, Florida. This included 156 species, all then positively known to occur in the county. In April, 1906, 17 species were added bringing the total up to 173 (Auk, XXIII, p. 153). The list was still further extended by the addition of 9 species in my article of April, 1907 (Auk, XXIV, p. 158), increasing the total to 182.

During the seven years since the publication of the last article, 10 species have been added to the list. These are Horned Grebe (*Colymbus auritus*), Herring Gull (*Larus argentatus*), Bonaparte's Gull (*Larus philadelphia*), Buffle-head Duck (*Charitonetta albeola*), Pectoral Sandpiper (*Pisobia maculata*), Duck Hawk (*Falco peregrinus anatum*), Short-eared Owl (*Asio flammeus*), Purple Finch (*Carpodacus purpureus purpureus*), and Junco (*Junco hyemalis*, subspecies?)

These additions bring the list of species now known to occur in the county up to 192.

Some further observations of interest have been made upon a few of the species included in former articles. These observations, together with the data respecting the 10 additions above stated, are here recorded.

The species now added to the list are numbered serially beginning with the number following the last in the preceding article. The last number, therefore, is the total of species so far recorded in the county.

List of Species.

183. **Colymbus auritus.** HORNED GREBE.— Probably a regular winter resident but not abundant. I identified two on December 7, 1908, in the possession of a negro who had killed them on Lake Jackson and was peddling them along with some wild ducks.

184. **Larus argentatus.** HERRING GULL.— I have never seen this species in the county and believe its occurrence to be sporadic, if not

accidental. One was seen on Lake Iamonia, in the northeastern part of the county, by Mr. Ludlow Griscom of New York City, on January 2, 1912.

185. **Larus philadelphia.** BONAPARTE'S GULL.— Two were seen on Lake Iamonia by Mr. Griscom on December 30, 1911. I have not seen the species in the county and believe its occurrence to be quite rare.

Aix sponsa. WOOD DUCK.— My friend Fred C. Elliot of Tallahassee found several of these ducks with their young on the Oclocknu River, the western boundary of the county during April, 1909.

186. **Clangula clangula americana.** GOLDEN-EYE DUCK.— If I have ever seen this duck in the county I did not recognize it. Yet I feel quite sure it must occur here in limited numbers during each winter. Mr. Griscom saw four in the northeastern part of the county on January 2, 1912.

187. **Charitonetta albeola.** BUFFLE-HEAD DUCK.— Probably a regular winter resident in limited numbers. On December 7, 1908, I examined a handsome male in the possession of a negro who had killed it on Lake Jackson that morning. This is the only one of this species I have positively identified as having occurred in the county.

188. **Pisobia maculata.** PECTORAL SANDPIPER.— On November 22, 1910, Fred Elliot and I were hunting snipe on the marshes of Lake Jackson, 9 miles north of Tallahassee and adjacent to the old Cotton Plantation, when he discovered a snipe-like bird in a flock of killdeers. After some maneuvering he succeeded in shooting the bird. He turned it over to me and I found that it was a Pectoral Sandpiper, the first known to have been taken in the county. Strangely enough, the following year, November 12, 1911, he shot another specimen while we were hunting in the identical locality. These two birds were feeding with killdeers and seemed to be an integral part of the flock, moving from place to place in perfect harmony with their hosts. No others were seen. It is probable that a few individuals of this species regularly occur in the county during the migrations.

189. **Falco peregrinus anatum.** DUCK HAWK.— Late in the evening of December 5, 1911, while hunting snipe on Lake Jackson, 9 miles north of Tallahassee, I saw one of these birds swoop down, on contracted wings, upon a flock of Killdeers which were feeding along the edge of a small pool. Apparently the Hawk had no intention of capturing one of the killdeers, for when within a few feet of the flock it suddenly changed its course and shot upward almost as swiftly as it had descended, and disappeared in the gathering darkness. This, however, may have been due to the sudden discovery of our proximity. The whir of the bird's wings as it descended first attracted my attention. The killdeers were sensibly perturbed for a few moments, as they emitted a series of notes indicative of alarm. This is the only one of these birds I have positively identified in the county. Another is recorded by Mr. Griscom as having been seen by him on December 25, 1911, on the Horse-shoe Plantation, the extensive winter estate of his family in the northern section of the county, and formerly the property of the writer's grandfather, (Bird-Lore, XIV, p. 33). Mr. Griscom also states in a letter to me that he has seen one or two several

times in the vicinity of Lake Iamonia. There is little doubt but that the species is represented in the county by a few individuals each winter, but their caution is such that they successfully avoid the presence of man.

190. **Asio flammeus.** SHORT-EARED OWL.— I have not seen this bird in the county. Mr. Griscom states in a letter to me that he has seen 6 during his visits of several winters to the Horse-shoe Plantation, 16 miles north of Tallahassee. It is not surprising that this bird should have been seen so seldom in the county as it is an inhabitant of marshes, well covered with long grass and weeds and is not easily flushed.

Antrostomus carolinensis. CHUCK-WILLS-WIDOW.— Although a common summer resident, this bird is rarely met with in the county during the winter months. My friend Fred Elliot and I were returning from a hunt on Lake Jackson, late in the evening of December 5, 1911, and as we entered a lugubrious stretch of woodland along the plantation road, a Chuck-wills-widow spookishly appeared and settled down on the ground immediately in front of the horses we were driving. It remained hardly longer than an instant when it coquettishly flitted a few feet further ahead and settled down again. This performance was repeated 8 or 10 times, in fact, until we emerged from the woods. The bird was in jeopardy of the horses' hoofs several times, but it evidently knew the strategic moment to move.

Antrostomus vociferus vociferus. WHIP-POOR-WILL.— This species was included as one of the birds of the county in my original article largely on the basis of a set of eggs which had been taken in the county and which I identified as those of the Whip-poor-will. I am no' sure that I had ever seen this bird in the county prior to November 23, 1909. Just at dusk on this date I was returning home with my father from a drive and as we were ascending McDougall's hill on the eastern edge of Tallahassee, a Whip-poor-will flew toward us and alighted on a fence post directly in line with our buggy. On the following day I was hunting with Fred Elliot on the old Cotton Plantation, 9 miles north of town, when, about noon, another Whip-poor-will flushed just to the side of our team from the pinewood brush along one of the plantation roads.

Archilochus colubris. RUBY-THROATED HUMMINGBIRD.— I mention this species here merely to give the earliest and latest dates it has been seen in the county. March 11 (1903) is the earliest date in my records. The latest, is October 25 (1906), when I saw one in the grounds of the state Capitol at Tallahassee.

191. **Carpodacus purpureus purpureus.** PURPLE FINCH.— To the severity of the winter of 1911–12 in the northern and eastern states may be attributed the appearance of this bird in Leon County. I had never known it to reach the county prior to this time. I first saw it on January 14, 1912, a cold, raw, dismal day, with the thermometer registering around 32°. There were about a dozen of the birds in some brush piled in our yard. Later in the day I found them feeding in the chick weed which was so abundant in the yard. One of the birds was in fairly bright red plumage;

the others were in the plumage of the females. They were quite unwary and seemed to be very much at home. The following day I saw a male in another section of the county and again saw the band of the previous day in the street near our home. From this time until March 2, when I left home for Washington I saw the birds frequently in various sections of the county and they were daily in our yard feeding in the patches of chickweed. Mr. Griscom saw ten of these birds on Christmas day, 1911, on the Horseshoe Plantation, (Bird-Lore, XIV, p. 33).

Passerculus sandwichensis savanna. SAVANNAH SPARROW.— My former articles indicate that this is rather an unusual bird in Leon County. Such is not the fact. It is a very common winter resident, frequenting the old corn fields in large numbers and often met with in the long, dry grass of the lake marshes.

192. **Junco hyemalis** subspecies? December 3, 1911, was a bright, moderate day and having business at Woodville, in the southern part of the county, my wife and I set out in our buggy for that place immediately after breakfast. The county south of Tallahassee is for the most part flat and sandy and otherwise characterized by vast areas of pines and blackjack oaks with rank grasses interspersed throughout. We had reached a point about five miles from town, and in country as described, when I heard the notes, made familiar to me by my experiences in the District of Columbia, of Juncos. I was not long in locating the birds, some 12 in number, on the ground and in the trees just off the road. I was not prepared to reduce a specimen to possession, hence am unable to determine whether these birds were slate-colored or Carolina Juncos. Although frequently in this vicinity and elsewhere in the county thereafter, during that winter, I did not again meet with this species. This is the only record I have of the occurrence of Juncos in Leon County.

Progne subis subis. PURPLE MARTIN.— On the twenty-sixth of January 1911, I left Washington for Milton and De Funiak Springs, Florida, to take testimony in several cases involving claims to lands in the Choctawhatchee National Forest. I stopped at Tallahassee on the twenty-eighth. On the twenty-ninth, a beautiful, spring-like day, my father, mother, sister, and I were sitting on the back porch about 11 A. M. when I heard the cheery notes of Purple Martins. I went out to the south side of our premises and saw two of the birds leisurely circling over a neighboring yard. I left that evening for Milton and remained there and at De Funiak Springs until February 6, when I returned to Tallahassee, reaching there on the seventh. During the eight days spent in west Florida I saw no signs of martins. Reaching Tallahassee I found them fairly common and apparently established there for the season. I had never before known these birds to reach the county at such an early date, although I had preserved a careful record of their arrivals for several years. I was at home in Tallahassee during the winter of 1911–12 and saw the martins for the first time on February 20, 1912. Six of these birds were flying high toward the northeast and at a rapid rate, seemingly

bent upon reaching some far away point without delay. Between this date and March 2 when I left for Washington, no others were seen.

Vermivora celata celata. ORANGE-CROWNED WARBLER.— Observations since my article of April 1906, establish this bird as a winter resident in the county. For several winters one was constantly to be seen, or its strong, unmistakable call note heard, in our yard. Frequently there were two on the premises. The earliest record I have of its fall arrival is November 12 (1905), but it undoubtedly reaches the county regularly at an earlier date.

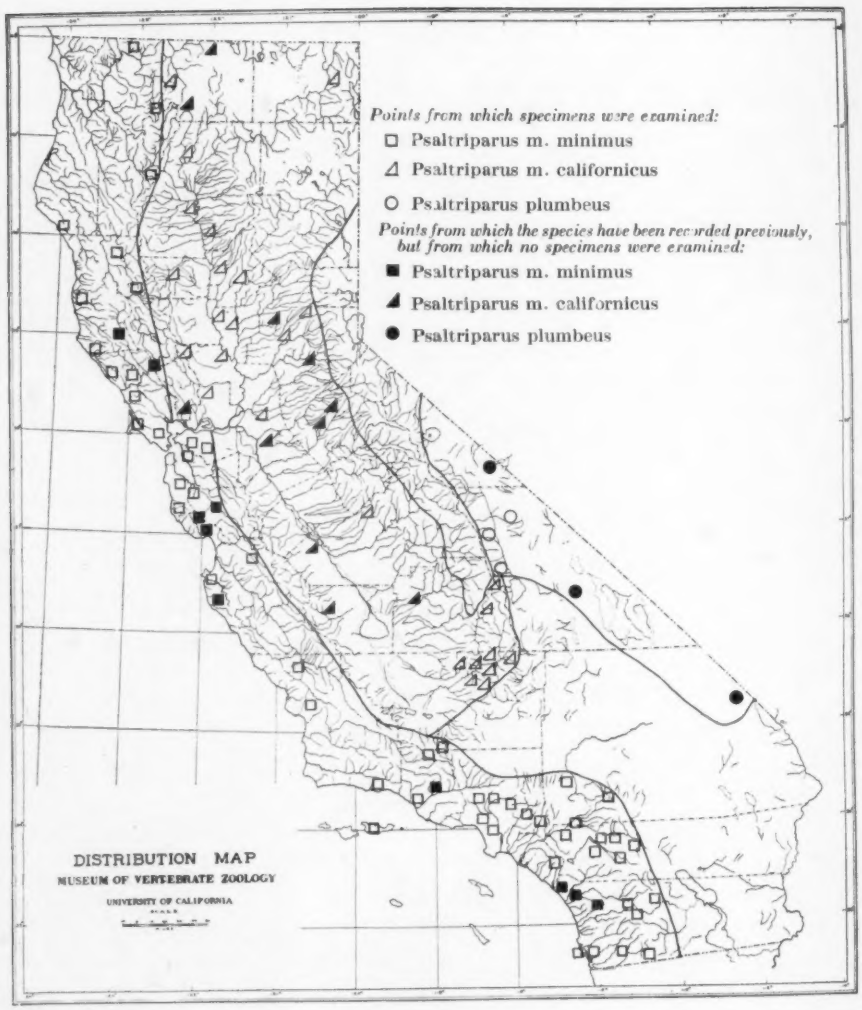
Compsothlypsis americana americana. PARULA WARBLER.— Although I have never found a nest of this bird in the county, there is no doubt but that it is a summer resident in limited numbers. Several were singing sweetly in our yard on April 22, 1911.

Dendroica magnolia. MAGNOLIA WARBLER.— This species is a regular fall migrant through the county, but in limited numbers. I saw a handsome male in our yard on October 8, 1911. I have no spring records but suspect it passes through the county at this season.

Dendroica striata. BLACK-POLL WARBLER.— I have heretofore recorded this bird as a fall migrant in the county. It also occurs in the spring migration, but the bulk of them passes over without stopping. My only spring record is of a single male seen on April 25, 1911, in a pecan tree in the rear of the First National Bank premises.

Sitta carolinensis carolinensis. WHITE-BREASTED NUTHATCH.— This is a winter resident in the county, but not common. I saw one in a pine tree at Woodville on December 3, 1911.

Hylocichla mustelina. WOOD THRUSH.— In my first article I recorded this bird as a rare migrant in spring. I have since learned that it also is a rare migrant in fall. On October 8, 1911, I saw one in our yard in Tallahassee. It was quite disturbed about something as was evidenced by its nervous movements and frequent notes of alarm so familiar to me in the District of Columbia where it is a common summer resident and, in the estimation of many, the sweetest songster there. On the 14th I saw another in our yard.


Points from which specimens were examined:
Psaltriparus m. minimus
Psaltriparus m. californicus
Psaltriparus plumbeus
Points from which the species have been recorded previously, but from which no specimens were examined:
Psaltriparus m. minimus
Psaltriparus m. californicus
Psaltriparus plumbeus
DISTRIBUTION MAP
MUSEUM OF VERTEBRATE ZOOLOGY
UNIVERSITY OF CALIFORNIA

DISTRIBUTION IN CALIFORNIA OF THE SPECIES AND SUBSPECIES OF PSALTRIPARUS.

THE CALIFORNIA FORMS OF THE GENUS *PSALTRIPARUS.*[1]

BY HARRY S. SWARTH.

Plate XL.

INTRODUCTION: Throughout the greater part of California, bush-tits are familiar features of the bird life of the state. Their wide distribution, covering the Transition and Upper Sonoran zones, and parts of Lower Sonoran, gives them a range over most of the state, except certain of the desert regions and the boreal mountain tops, while the sociable and confiding nature of the birds brings them into intimate contact with all who care to cultivate their acquaintance. Consequently the many interesting and curious aspects of the life history, at least of the California species, are well known, having been observed and reported upon by various competent observers.

The status and relationships of the different races of the bush-tit, however, have not so far been worked out to a satisfactory conclusion, different authorities arriving at markedly different results, while none of them seems adequately to have covered the situation. This condition became more and more apparent with the growth of the ornithological collection of the Museum of Vertebrate Zoölogy. Series after series of bush-tits were brought in from various parts of the state, taken at all seasons of the year, and presenting a range of variation that apparently defied explanation by any known facts or theories regarding the species. The specimens finally brought together for the present study, however, over four hundred in number, seem to be quite satisfactorily representative of existing conditions in the genus in the state of California, enough so, I believe, to justify the publishing of the conclusions to which they have assisted.

Such a study as the present one is obviously incomplete. Although an excellent representation of material from California is available, yet the genus under consideration covers a much wider range than this one state, and the scrutiny of Californian specimens

[1] Contribution from the Museum of Vertebrate Zoology of the University of California.

inevitably suggests problems and questions to be answered only by means of extensive series from other points. My conclusions as herein stated refer only to the California forms of *Psaltriparus* — *P. minimus minimus*, *P. minimus californicus*, and *P. plumbeus*. Of the subspecies *P. minimus saturatus*, from the Puget Sound region (not included in the A. O. U. Check-List), the specimens at hand are too few in number to justify any expression of opinion. Of the Lower California form, *P. minimus grindæ*, no skins were examined. Neither did I have examples of any form of *P. melanotis*, and although the variations of this last mentioned species would seem to have little or no bearing upon any California problem, yet the relationships of *melanotis* to *plumbeus*, and of *plumbeus* to *minimus*, are such that only a general survey of the whole group, based upon at least as much and as satisfactory material from all regions as has been available from parts of California, could serve to explain certain of the questions that have arisen.

In the conclusions at which I have arrived I have been influenced throughout by one belief, a fact sometimes questioned, but of the truth of which both observation in the field, and the study of specimens, has convinced me. This is, that the various species of bush-tits, at least in California and Arizona, are absolutely resident wherever found. Under this conviction I have sought to explain every observed variation in specimens on any grounds other than that of the migration of one form into the habitat of another.

Perhaps it may be worth while to detail some of the evidence on which this belief is based. Some years ago I published (Swarth, 1900, pp. 14–16, 37–41) a list of birds observed at a point near Los Angeles, California. Of the one hundred and seventy-five species included therein only a small fraction were breeders, the bulk of the list being composed of migrants. Obviously this place was in an extensively used migration path. In many years' observation, continued long after this paper was published, but one solitary bush-tit was seen at this station, though some three miles to the northward, and perhaps a little farther southward, the species is locally a most abundant resident.

In all my experience I have never seen bush-tits in flight suggestive of migration. On the Berkeley campus, as one favorable place of observation, it seemed apparent that the same flocks of birds in

their wanderings traversed what appeared to be quite well defined paths, flitting from tree to tree, and along the same general lines of travel, at pretty regularly recurring intervals, week after week, throughout fall, winter, and spring. Of course it can not be proved that these were actually the same individuals, but the impression that they were was strongly conveyed. Other and similar corroborative evidence occurs to me, while on the other hand, as before stated, I have no recorded observations suggestive of any migrations by these birds.

Bush-tits, in southern California at least, do wander in late summer to higher elevations in the mountains than those at which they breed. Also the capture of birds in winter at such points as Palm Springs, on the Colorado Desert, or at Victorville, on the Mohave Desert, as recorded beyond, is undoubtedly due to their straying from the nearby mountains along some favorable, wooded river course, or similar attractive path. But these occurrences are not indicative of any regular migratory habits, which, as stated above, I do not believe to exist.

ACKNOWLEDGMENTS: The present study is based primarily upon the series of bush-tits contained in the collection of the Museum of Vertebrate Zoölogy, being in fact partly inspired by the desire to bring the Museum's catalogues into a more orderly and consistent arrangement, as regards this genus. The Museum's series, inclusive of the Grinnell, Morcom, and Swarth collections, contains at the present writing three hundred and fifty specimens of *Psaltriparus.* In addition to these a small number of skins was borrowed from several other sources, illustrative of various important localities not represented in the Museum collection. The writer wishes to express his gratitude to Dr. C. W. Richmond, Acting Curator, Division of Birds, of the United States National Museum, for the loan of typical specimens of *Psaltriparus minimus minimus,* and *P. minimus californicus;* to Messrs. Joseph Mailliard and J. W. Mailliard, for examples of *P. minimus minimus* from several critical California points; to Mr. William L. Finley, for skins from the Oregon State Game Warden's collection, and to Mr. Stanley G. Jewett, for some from his own collection, representative of both *P. minimus minimus* and *P. minimus californicus* from Oregon localities. There were also available the specimens in the Los An-

geles County Museum of History, Science and Art, where are housed the Daggett, Lamb, Law, Richardson, and Willett collections. Altogether, four hundred and thirty-three specimens were examined in the present connection.

VARIATION: There is probably hardly another species of bird, as plainly colored as the California Bush-tit and with as few distinctive markings, which shows such a wide range of variation in appearance in individuals taken under different circumstances. This variation has proved a constant obstacle toward an understanding of the several California species and subspecies of *Psaltriparus*, for it is only in large series taken at many different points that there appears to be any sign of law and order controlling the observed differences. Even the large number of specimens available in the present study is not sufficient to illustrate all of the phases of the situation, though it does appear to be ample for the deduction of the conclusions at which I have arrived.

Birds of this genus are subject to at least four kinds of variation. They differ: (1) seasonally, through fading and abrasion; (2) at different ages, adult and juvenal plumages being readily distinguishable; (3) geographically (the various species and subspecies, or geographical races); and (4) in one species, *melanotis* (not occurring in California), there is sexual difference, the male and female being strikingly different. But this last is a phase of the subject that need not be considered here.

SEASONAL VARIATION: The changes in appearance undergone during the year by the California Bush-tit (*P. minimus minimus* and *P. minimus californicus*), aside from the alteration brought about by the molt, are unusually striking for so plain colored a bird. In the Horned Lark (*Otocoris alpestris*), the Snow Bunting (*Plectrophenax nivalis*) and others, conspicuous patterns are revealed by the continued abrasion of the feathers; while in birds such as the Blue Grosbeak (*Guiraca cærulea*) the brilliant color of the whole body is disclosed through the same agency, but in the bush-tits there are no such underlying markings. The altered appearance is in this case largely due to change of color,— fading of the feathers, and not to the removal of feather tips differently colored from the rest of the plumage. The pileum and the remainder of the upper parts are differently colored in *P. minimus*, and are differently affected by

exposure during the year, so that various combinations result. This species varies seasonally to a much greater extent than does *P. plumbeus.*

The southern California series of bush-tits is the most extensive one available, and there are enough specimens from this region to illustrate the change in appearance during the year. Between birds in the freshly acquired plumage of October, and those in the frayed feathers of May and June, there is a vast difference. Selected specimens at hand, representing almost every week of the intervening period, laid out in chronological order, clearly illustrate the nature of the change, and show that there is some alteration in appearance from month to month almost throughout the year. There are sufficient specimens of bush-tits at hand from the central coast region of California, the Sacramento Valley, and the Sierra Nevada, to indicate similar seasonal changes in these birds also, though not enough material to illustrate every step of the transformation at any one point. *P. plumbeus,* as shown by series of skins from Arizona, Nevada, and east central California, undergoes practically the same process of change, though being a more uniformly colored bird, the variations are not nearly so striking.

As the described subspecies of the California Bush-tit, *P. m. californicus, P. m. minimus,* and *P. m. saturatus,* are largely distinguished by varying intensity of coloration, it follows that there is more or less 'overlapping' of this character in the various forms. Thus a faded example of *minimus* might be expected to bear a close resemblance to a fresh fall specimen of *californicus,* and similarly, a late spring *saturatus* would be much like a newly molted autumnal *minimus.* Of *saturatus* I cannot speak with certainty, having but one or two specimens available, but of *minimus* and *californicus,* although the above statement is approximately correct, other features remain which tend to distinguish the forms.

There is, however, still another angle to the problem, for in birds from different regions abrasion does not proceed with equal speed. This statement has also been made of the Red-winged Blackbirds Mailliard, 1910, p. 64), and is probably true of most birds. In general it appears that abrasion and fading produce much more marked results in an arid than in a humid region, though, as stated by Mailliard (l. c.), other factors enter into the question also.

It is customary on the part of many to speak slightingly of the custom of identifying specimens on geographical grounds, that is to apply to a certain example of bird the name of the subspecies supposed to occur at the point where this bird was collected, as sufficient grounds for identification. Even were this practice generally as objectionable as some appear to believe, it seems that in the California bush-tits we have a case where it can be done with perfect propriety. Examination of large series of specimens discloses the existence of certain different geographical races, each apparently resident within its own borders. The color variations of these races, however, are such that specimens of one, taken at a certain season, may closely resemble examples of another, taken at a different time of the year. Hence the collector of a few skins, taken at scattered points and different seasons, could easily be misled as to the significance of the variations or similarities he observes. It seems to me that, providing he assures himself of the pertinence of the limited comparisons possible to him, he is perfectly justified in naming his specimens on 'geographical considerations.'

MOLT: There is but one molt during the year. This takes place during the late summer, at the time of the conclusion of family cares of the adults, and when the young are molting into first winter plumage. The sequence of changes in *P. minimus minimus*, as illustrated in a series from southern California, is (omitting the natal down) about as follows:

Toward the end of May young birds begin to appear out of the nests, generally with wing and tail feathers fully developed, in other words in full juvenal plumage. This is worn without change for about two months, when, toward the end of July, the post-juvenal molt begins. There are several specimens at hand showing the inception of this molt: No. 3269, juvenal female, Reche Canyon, Riverside County, July 27, 1908; several new secondaries and some new greater wing coverts. No. 5214 (Grinnell coll.) juvenal male, Pasadena, July 29, 1902; at practically the same stage, with several new secondaries and some new coverts, but otherwise still in juvenal plumage. Other specimens at hand show this molt in progress until the end of September.

The annual molt of the adults is taking place at the same time, having begun a little earlier. Birds taken during June have the

plumage worn and faded, but as yet show no pin feathers. No. 2651, adult female, San Jacinto Mountains, July 11, 1908, is well started in the molt, with several of the old tail feathers still in place, but with stubby new ones also appearing, and with some new and some old flight feathers and coverts, and a mixture of new and old plumage over the body. No. 6100 (Grinnell coll.), adult male, El Monte, Los Angeles County, September 22, 1904, has almost accomplished the change, but careful scrutiny shows that the first (outer) primary has just begun to appear, and also that there are many pin feathers and some remnants of the old plumage, scattered over the head and body. One or two other specimens taken a little earlier in September are nearly as far advanced; but speaking in general it is not until the second week in October that the molt can be said to be entirely over. Two specimens taken at Witch Creek, San Diego County, October 10, 1908 (nos. 3994, 3995), are in perfect winter plumage, the earliest taken skins at hand of which this can be said. The molt is thus shown to be of quite long duration, about three months for adults, and a little less for the post-juvenal molt.

There are numerous specimens at hand collected in southern California during fall, winter, and spring, enough to show that while the birds undergo marked changes in appearance before the following summer, it is due entirely to fading and wear of the feathers. At the completion of the molt, post-juvenal or annual as it may be, adults and young are practically alike, and can no longer be distinguished by external appearance.

The molt of *P. minimus californicus* is illustrated in series from the Sacramento Valley and the Sierra Nevada. There are specimens in juvenal plumage taken in Yolo County, May 22 and later; birds beginning to molt, from the southern Sierras in Kern County, the third week in July; and adults and immatures with the molt not quite accomplished, from Placer County, the third week in October. The sequence of events is thus practically the same as in the southern California bird.

Of *plumbeus*, adults and juveniles from Arizona, Nevada, and east-central California show substantially the same changes over the same seasons.

PLUMAGE VARIATIONS AT DIFFERENT AGES: Besides the scanty natal down, worn for a short period by the nestling, there are appar-

ently but two distinguishable stages of plumage during the lifetime of the individual: (1) the juvenal plumage, acquired in the nest, and worn about four months; and (2) the first and subsequent winter plumages. Adults and immatures are, as far as I can see, absolutely indistinguishable after the autumnal molt, when the young bird loses the juvenal plumage, and the adult the faded and shabby last year's garb, and both don similar covering.

Following are detailed descriptions of selected juvenals and adults of the various California species and subspecies of *Psaltriparus*.[1]

Psaltriparus minimus minimus.

No. 2123; juvenal male in fresh, newly acquired plumage; San Jacinto Mountains, Riverside County, California; May 24, 1908. Pileum, buffy-brown; back, hair-brown; under surface of body, whitish, palest on throat, and darkening to drab-gray on sides and flanks.

No. 2529; juvenal male in very worn plumage; San Jacinto Mountains, Riverside County, California; August 25, 1908. Pileum, avellaneous; back mostly clothed in new feathers; plumage of under surface of body abraded so that most of the light colored tips of the feathers are worn away, and the dusky bases show through. The bird is generally dirty and faded in appearance.

No. 1623 (Grinnell coll.); male, in fresh, fall plumage; Pasadena, California; October 17, 1896. Pileum, olive-brown; back, rather darker than hair-brown; under parts darker than in the juvenal plumage, drab-gray on throat and median line of belly, darkening to drab on sides and flanks.

Although there are distinguishable dissimilarities in coloration between adults and juvenals, these differences are not great. They are accentuated, however, by the different textures of plumage in the two stages. The juvenal, with shorter and fluffier feathers, and with more extensively light-colored bases, gives a general effect that is rather mottled and uneven. The adult (first winter and later), with the plumage more dense and lustrous, has a generally smoother and better groomed aspect.

[1] In descriptions of colors Ridgway's *Color Standards and Color Nomenclature*, 1912, has been the basis for comparison.

No. 2531; adult male, in worn and faded plumage; San Jacinto Mountains, California; May 28, 1908. Pileum, buffy-brown; back, a somewhat clearer gray than in the fresh plumage of no. 1623 (described above). Under parts more distinctly whitish, with the darker drab color practically limited to a small area on the sides. Rectrices and remiges noticeably faded and frayed.

Psaltriparus minimus californicus.

No. 21059; juvenal female, in fresh, practically unworn, plumage; Weldon, Kern County, California; July 5, 1911. Pileum, buffy-brown; back, light grayish-olive. As compared with *minimus*, the upper parts are less brownish, and the under parts are of a clearer gray, with less dusky suffusion. The cap on the pileum is less sharply defined on the sides of the head.

No. 23319; male in first winter plumage (immaturity determined from condition of skull); Blue Canyon, Placer County, California; October 17, 1912. Pileum, fuscous; dorsal surface of body, dark olive-gray; ventral surface much paler — chin, throat, and upper breast, almost pure white, darkening to drab-gray on lower breast and abdomen.

Two adult males and another immature taken at the same time and place, are practically indistinguishable in coloration. A third immature male of the same series is appreciably darker, however; pileum, chætura drab; back, deep mouse gray; under parts less whitish and more dusky. A distinguishable feature separating this exceptionally dark colored example of *californicus* from *minimus*, is that while in the latter the darker colors tend more toward the brownish hues, in this bird the colors are more blackish. Although it is unusually dark colored, it is quite unlike any example of *minimus* at hand.

Psaltriparus plumbeus.

No. 5884 (Swarth coll.); male, in fresh, winter plumage; Huachuca Mountains, Arizona; October 12, 1907. Pileum, neutral gray; rest of upper parts grayish-olive. Under parts, whitish, with a slight dusky suffusion. A brownish colored area, including ear

coverts and cheeks, rather sharply defined against the white of the throat and the gray of the rest of the head and neck. Specimens taken in early spring (February, March, and April) have lost the olivaceous tinge on the dorsum, and the upper parts are uniformly clear gray. Summer specimens (May, June, and July) have the gray dulled by excessive wear of the feathers.

No. 9956; juvenal female; Huachuca Mountains, Arizona; July 15, 1896. Practically like adult. The gray of the upper parts is duller, less of a blue-gray, the brown cheeks are not so sharply contrasted against the rest of the head, and there is a faintly indicated black line over the auriculars and on the nape. Unlike the adults, the young of *plumbeus* exhibit considerable diversity in markings, and while the above described specimen represents the plumage perhaps most frequently encountered, there is a large proportion of birds with more or less extensive black markings on the head. In a few specimens there is no trace of head markings, a number have them faintly indicated, as in the specimen described above, and in others the patterns vary from a narrow line extending backward from the eye, to nearly as extensive a black marking as in the adult male of *P. m. lloydi* (see Swarth, 1913, pp. 399–401).

GEOGRAPHICAL VARIATION: It is, of course, the variation shown among individuals from different regions, the study of species and subspecies, that has attracted the attention of most workers in the group, and the present study of the genus, like most others, is the outcome of an attempt to correlate with definite geographic areas certain observed variations in a series of specimens.

Of recent years there have been published three authoritative accounts of the distribution of the species and subspecies comprising the genus *Psaltriparus*. These, in order of publication, are Oberholser's (1903, pp. 198–201) 'Synopsis of the Genus Psaltriparus,' Ridgway's (1904, pp. 423–436) treatment of the group in his 'Birds of North and Middle America,' and the A. O. U. Check-List, third edition (1912, pp. 352, 353). As regards the various races of *Psaltriparus minimus*, the contradictory nature of the statements contained in these works has caused much confusion among local students in California. This has resulted in a haphazard use of different names for the same bird, according to the authority consulted at the time, with, in recent years, a growing

tendency to ignore the subspecies *californicus*. Following are quotations of ranges as given in the publications cited.

Psaltriparus minimus minimus.

"Pacific coast region, from San Francisco Bay, California, to Washington" (Oberholser).

"West slope of coast mountains in Oregon, California, and northern Lower California, north to the Columbia River, south to Nachoguero Valley, Lower California (also to San Pedro Martir Mts., and San Fernando?)" (Ridgway).

"Transition and Upper Sonoran zones of the Pacific coast from southern British Columbia and northern Washington to northern Lower California" (A. O. U. Check-List).

Psaltriparus minimus californicus.

"California, excepting the northern coast region; northern Lower California" (Oberholser).

"Interior districts of Oregon and California east of the Cascade range in Oregon, and between coast mountains and crest of the Sierra Nevada in California; north to northwestern Oregon (Wilbur, Umatilla County), south to the valley of Kern River (Walker's Basin, etc.), southern California" (Ridgway).

"Transition and Upper Sonoran zones of Oregon and California (except coast strip) from northeastern Oregon to southern California" (A. O. U. Check-List).

Among these contradictory views it will be noted that one authority restricts *minimus* to the coast region north of San Francisco Bay, while another apportions both *minimus* and *californicus* to southern California. The ranges ascribed to *minimus* and *californicus* by Oberholser are similar to an earlier disposition of the races by Ridgway (1884, p. 89).

The results of the present study are most nearly in accord with Ridgway's later statements; that is, as regards distribution in California. There has been no Lower California material available, and while the few specimens at hand from the range of the northern form named *saturatus* are not appreciably different from apparently

comparable examples of *minimus*, still the material is not sufficient to warrant any generalizations.

Following are statements of the manner of occurrence in California of the species and subspecies of *Psaltriparus* found within the state, as deduced from the specimens assembled for the present study.

Psaltriparus minimus minimus (Townsend).

Type locality.— Columbia River, probably near Fort Vancouver, Washington.

Range in California.— Lower and Upper Sonoran zones of a comparatively narrow strip along the coast at least from the Oregon line south into northern Lower California. In northern California east to the Siskiyou and Trinity mountains; directly north of San Francisco Bay this strip is confined within extremely narrow limits; in southern California it extends to and includes the northern and eastern slopes of the San Gabriel, San Bernardino, San Jacinto, and Cuyamaca mountains. On Santa Cruz Island, of the Santa Barbara group.

Specimens examined from the following localities. Siskiyou County: Callahan; Horse Creek, Siskiyou Mountains. Shasta County: Tower House. Humboldt County: Shelter Cove. Mendocino County: Gualala; Covelo; Mendocino; Mount Sanhedrin. Sonoma County: Guerneville; Freestone; Seaview. Marin County: San Geronimo; Nicasio; Inverness; Point Reyes. Contra Costa County: Walnut Creek; Mount Diablo. Alameda County: Berkeley; Oakland; Piedmont. San Mateo County: Woodside; Pescadero. Santa Clara County: Palo Alto. San Benito County: Paicines. Monterey County: Pacific Grove. San Luis Obispo County: San Luis Obispo; Paso Robles. Kern County: Fort Tejon. Santa Barbara County: Santa Barbara; Santa Cruz Island. Ventura County: Ventura; Mount Pinos. Los Angeles County: Glendora; Claremont; Santa Monica Mountains; Cerritos; San Fernando; Pasadena; El Monte; Azusa; Los Angeles. San Bernardino County; San Bernardino; San Bernardino Mountains; Reche Canyon; Victorville. Orange County: Trabuco Canyon. Riverside County: Riverside; San Jacinto Mountains; Palm Springs. San Diego County: Jacumba;

Cuyamaca Mountains; Dulzura; Julian; Campo; Witch Creek; Point Loma; San Diego. Total number of specimens, 243.

Distinguishing Characters.— From the other two species of the genus (*P. melanotis* and *P. plumbeus*) *Psaltriparus minimus* is distinguished by having the pileum differently colored from the rest of the upper parts, forming a sharply defined "cap." *P. minimus minimus* as compared with *P. m. californicus*, is darker colored throughout, birds seasonably comparable being contrasted, the under parts are heavily suffused with dusky, and the flanks are more distinctly vinaceous. These differences are quite as apparent in the juvenal plumage as in the adult, sometimes more so. The general appearance of *P. minimus minimus* is of a *brownish* colored bird, as contrasted with the gray and white tones of *P. m. californicus*. In measurements *minimus* and *californicus* are practically alike. Compared with *plumbeus* they have shorter wing and tail, bulkier bill, and the same length of tarsus.

Remarks.— Of specimens representative of *P. minimus minimus*, there are available four skins from Portland, Oregon, practically topotypes of the subspecies. Three of these, adults taken in May, are from the collections of W. L. Finley (no. 255) and S. G. Jewett (nos. 845, 846); the fourth, a young bird, also taken in May, is from the collection of the United States National Museum (no. 149651). This series, though of few specimens, affords a good basis for certain comparisons.

In commenting upon the California collections of the various subspecies, a discussion of the series from each of the different localities seems to be the method most conducive to a clear understanding of conditions.

San Diegan District (specimens from San Diego, Orange, Riverside, San Bernardino, Los Angeles, Ventura, and Santa Barbara counties). The large number of skins from southern California, one hundred and sixty specimens from points ranging from San Diego to Santa Barbara, is fully illustrative of all seasonal variation. It has been possible, in fact, to make a selection of birds showing, almost week by week, the change in appearance throughout the year, and this has been most helpful toward an understanding of conditions presented in smaller series from other points.

As to the status of the southern California bird, it belongs un-

doubtedly to the subspecies *minimus*. Examples from this region are very dark colored, quite as much so as those from any other part of the coast district — in fact they average duskier on the under parts than specimens from any other point in California. The Portland specimens taken in May, mentioned above, are, it is true, somewhat darker colored than comparable birds taken during the same month in the San Diegan district; but this, I believe, is largely due to the more rapid rate of fading in the sunnier, more arid conditions of the latter region. February birds from Los Angeles are exactly like the May birds from Portland.

Furthermore, there is no evidence whatever of the existence in southern California of two forms of *Psaltriparus minimus*, along the coast and in the interior, respectively, as given by the A. O. U. Check-List. But one subspecies occurs in that part of the region inhabited by bush-tits, from the Pacific Ocean to the western edge of the Colorado Desert. It would be surprising if it were otherwise, for there is no other instance (except among the island birds) of two subspecies of any one species being resident in the San Diegan district.

Specimens are at hand from various outlying points on the boundaries of this district. Two winter birds from Victorville, at the edge of the Mohave Desert, are unquestionably *minimus*, and are doubtless wanderers from the neighboring San Bernardino Mountains. Birds from Mount Pinos, Ventura County, and the nearby station of Fort Tejon, at the southwestern extremity of Kern County, are likewise *minimus*, these localities representing the extreme limits of the subspecies in this direction. Four examples from Santa Cruz Island (nos. 3104, 3106, 3265, Mailliard coll., no. 5449 Grinnell coll.) are not to be distinguished from the form occurring on the adjacent mainland. Although the birds are doubtless resident upon Santa Cruz, the available material does not reveal development of any characters serving to distinguish a separate island race.

Santa Cruz District (specimens from San Luis Obispo, Monterey, San Benito, Santa Clara, and San Mateo counties). There is a relatively scanty amount of material from this region, but these few specimens are satisfactorily referable to *minimus*. In fact the only ones calling for comment are two March birds from Paicines, San

Benito County (nos. 6338, 6339, Mailliard coll.). These are appreciably paler than comparable specimens from southern California; and from the geographical position of the station the possibility is suggested of their being intergrades with *P. m. californicus*, which *may* be found to inhabit the adjacent San Joaquin Valley. Unfortunately there is not a single specimen of bush-tit available from this valley, the greater part of which is a treeless plain and unsuited to the species. There are parts, however, as in the immediate vicinity of the San Joaquin River, where the birds occur, recorded in fact from one or two points, and it will be of interest to learn to which of the races they belong.

San Francisco Bay District (specimens from Alameda, Contra Costa, and Sonoma counties). Many of the birds from the immediate vicinity of Berkeley and Oakland are strikingly dark colored, but this is undoubtedly due to staining of the feathers from the smoke of the nearby cities. Gardens and parks, filled with shrubbery, tempt the birds into the towns, to within a short distance of manufacturing and business centers, resulting in sooty plumage in the bush-tits, as with other species.

Three birds from Mount Diablo, Contra Costa County, as well as eight from the nearby station of Walnut Creek, are all clearly referable to *minimus*, demonstrating in this as with other species of animals, the relationship to the coast fauna of the inhabitants of this mountain, the easternmost outpost of the coast range at this point.

A series of nine specimens from Sonoma County (immediately north of San Francisco Bay), though on the whole referable to *minimus*, contains several light colored birds, possibly an indication of intergradation with *californicus* of the Sacramento Valley.

Northern Coast District (specimens from Marin, Mendocino, and Humboldt counties). This region should produce the darkest colored bush-tits of any portion of the state, reasoning from meteorological and geographical conditions, but the fact remains, surprising as it seems, that specimens from the southern portion of this region do not average as dark as those from the San Diegan district, and many of them are distinctly pale colored. One juvenile (no. 24099) is very similar to comparable examples of *californicus* from the Sacramento Valley. Certain July adults from the

coast of Mendocino County have faded on the upper parts to the exact color of July adults from the Sierras, though southern California birds of the same date are darker colored. On the lower surface, however, the Mendocino birds are distinctly dark, quite different from the gray *californicus*.

On the whole, of course, these coast birds are representative of *minimus*, but there is not nearly the difference between *minimus* of the northern coast district and *californicus* of the Sacramento Valley, to the eastward, that there is between southern California *minimus* and *californicus* of the southern Sierra Nevada.

Ridgway (1884, p. 89), in an early paper on the species, comments upon the paler colors of Marin County specimens, as compared with typical *minimus*, disposing of the question by regarding these birds as intergrades toward the grayer *californicus*, the range of which he at that time considered as including the coast of California south of San Francisco Bay. As the more southern birds are now known to be of the race *minimus*, and as, in fact, specimens from the southernmost extremity of the range of the subspecies are as dark colored as any, this explanation no longer holds. The possibility suggests itself that from the extremely narrow delimitations of the range of *minimus* in Marin, Sonoma, and southern Mendocino counties, compared with the vast area of country directly to the eastward swarming with bush-tits of the subspecies *californicus* (for, unlike the San Joaquin Valley, the Sacramento Valley presents conditions peculiarly favorable to the species), there is a constant influx of individuals of the more numerous race, *californicus*, continually encroaching upon the limited territory of the coast form. If the latter occupied a wider area the appearance of intermediates along the border line would not be particularly exciting of comment, but from the nature of conditions at this point these paler colored birds are distributed over the entire width of the restricted coast strip. It seems, in fact, as though there was here something similar to certain cases commented upon by Grinnell and Swarth (1913, p. 393), among problems concerning the distribution of various animals in the San Jacinto Mountains, California, where, from the narrowness of the region of blending of closely related subspecies, peculiar conditions ensue.

Among other observed results, types of either one of two strongly

contrasted faunas were found encroaching to a marked extent into their neighbor's territory, Colorado Desert forms into the San Diegan district, and vice versa. In the particular case in point we can well conceive of the coast bush-tits throughout this peculiarly attenuated strip of appropriate territory being dominated by the sheer numbers of continually dispersing individuals of *californicus*, and the distinguishing subspecific characters of the birds suffering in consequence.

South of San Francisco Bay the humid coast strip (Santa Cruz district) though narrow, is sharply cut off from the violently contrasted San Joaquin Valley, which is besides almost destitute of possibly competing bush-tits, hence there is every reason for the coast birds preserving their distinctive characters. To the northward, beyond Marin County, the coast region is also definitely separated from the interior valleys; but immediately north of San Francisco Bay, in southern Marin and Sonoma counties, the mountains, which here closely approach the coast, become so low and broken as to lose much of their effectiveness as barriers, and, as suggested above, there is little to hinder the influx of birds from the Sacramento Valley, densely populated with bush-tits of the subspecies *californicus*. It may well be that not only the peculiar observed conditions among the bush-tits, but also similar instances encountered among certain other birds of the same region, are to be explained by the peculiar combination of circumstances at this point. These conditions briefly summarized, are: Marked restriction of territory appropriate to the humid coast races, ineffective barriers interposed against complementary forms of much greater numbers occupying adjacent territory, and continual encroachment of individuals (the radiating overflow) of the latter subspecies.

Northcentral California. Small series of skins at hand from the Siskiyou Mountains, in extreme northern Siskiyou County, and from the Trinity Mountain region in southeastern Siskiyou County and northwestern Shasta County, prove rather difficult to allocate. It seems apparent, however, that these birds must be considered as intergrades between *minimus* and *californicus*, though obviously nearer the former. In fact certain of the specimens are not to be distinguished from typical examples of *minimus* in comparable plumage, though others from the same localities evidently tend

toward the grayish type. It is evident that in this part of the state an arbitrary line must be drawn between the ranges of the two subspecies, and from the material available at the present writing, it seems as though this division may be indicated about through the middle of Siskiyou County. The single specimen at hand from Yreka is of the *californicus* type, and there are others of similar character from southcentral Oregon.

Psaltriparus minimus californicus Ridgway.

Type locality.— Baird, Shasta County, California.

Range in California.— Lower and Upper Sonoran zones chiefly. In extreme northern California from central Siskiyou and western Shasta County east to the Nevada line; throughout the Sacramento Valley; possibly in the San Joaquin Valley (?); on the western slope of the Sierra Nevada everywhere below Boreal, and on the eastern slope, the same zones, north to Carroll Creek, Inyo County; south to the southern extremity of the Sierras (numerous specimens from points on Kern River, Walker Basin, etc.), the Greenhorn Mountains, and, the southernmost point of record, the Piute Mountains.

Specimens examined from the following localities.— Siskiyou County: Yreka. Shasta County: Baird. Tehama County: Tehama; Red Bluff. Glenn County: Winslow. Butte County: Chambers Ravine; Chico. Sutter County: West Butte; Marysville Buttes. Yolo County: Grand Island; Rumsey. Solano County: Vacaville. San Joaquin County: Tracy Lake. Modoc County: Warner Mountains. Placer County: Blue Canyon; Gold Run. Madera County: Raymond. Tulare County: Cannell Meadow; Trout Creek. Kern County: Fay Creek; Weldon; Greenhorn Mountains; Kiavah Mountain; Bodfish; Isabella; Walker Basin; Piute Mountains. Inyo County: Carroll Creek. Total number of specimens, 110.

Distinguishing Characters.— As compared with *P. minimus minimus*, of clear gray and white tones of color, rather than of the brownish hue of that subspecies. Typical *californicus* is often almost pure white beneath, noticeably so in the juvenal plumage. Sides and flanks slightly or not at all tinged with vinaceous.

Remarks.— There are at hand three specimens from Baird, Shasta County, California, the type locality of *californicus*. Judging from the available material it seems unfortunate that a Shasta County specimen was selected as the type of the paler colored inland race of the California bush-tit, for the locality is at the extreme edge of the territory occupied by the subspecies, and individuals from this point do not exhibit the best manifestation of the characters of the form. Birds taken but a short distance west of the type locality of *californicus* must perforce be assigned to the subspecies *minimus*, while topotypes of *californicus* are more of the nature of intergrades beween the pale inland and dark coast races. This view is quite in accord with the recognized faunal position of the Shasta and Siskiyou regions (see Merriam, 1899; Anderson and Grinnell, 1903).

Sacramento Valley (specimens from Tehama, Glenn, Butte, Colusa, Sutter, Yolo, Yuba, Solano, and Sacramento counties). Birds from the Sacramento Valley may be regarded as unquestionably representative of the pale, interior subspecies. They are distinctly grayer than birds from Shasta and Siskiyou counties, to the northward, and are closely similar to Sierra Nevada birds. Juveniles from the two regions (Sacramento Valley and Sierra Nevada) are, in fact, practically indistinguishable; adults from the former point are perhaps a trifle darker, and are more distinctly vinaceous on the flanks.

Segregated series from the eastern and western sides of the Sacramento Valley do not show any correlated differences. In other words, although the Sacramento Valley series as a whole tends slightly toward *minimus*, compared with the exceedingly gray Sierra birds, there is no perceptible darkening from the eastern to the western sides of the valley. Eight April adults from Sutter County (Sacramento Valley) are slightly darker than three birds from Raymond, Madera County (in the western foothills of the more southern Sierras), also taken in April. These series contain about the best seasonably comparable adults available from the two regions, though there are plenty of juveniles and old birds in worn plumage, and tend to confirm the relative positions above accorded the birds from these sections.

Warner Mountain District (specimens from Sugar Hill; Dry

Creek; Parker Creek). A series of sixteen specimens (eight adults and eight juveniles) from this section, presents several points of interest. These birds, together with those from the Sierras, exhibit the extreme of grayness in appearance reached by any bush-tits of this species. Comparing Warner Mountain and Sierra Nevada birds, taking comparable adults and young of each, there are no distinguishable differences in coloration. In measurements the former average a trifle larger. In each of the two series there are individuals in which the pileum is much less markedly contrasted with the back than is the case with specimens from any other point. In an adult male from the Warner Mountains (no. 15297) the difference in color on pileum and back is hardly appreciable, nor are the two areas sharply separated. This bird is strikingly similar to an adult male from the east slope of the Sierra Nevada which I have referred to *plumbeus* (see beyond), in which there is nearly as distinct a suggestion of a cap, differently colored from the back.

The Warner Mountain birds average somewhat larger than specimens of *californicus* from other points, as on the western slope of the Sierras. Aside from this slight difference, however, they apparently are not to be distinguished from examples from the central and southern Sierra Nevada. Unfortunately there is a dearth of data and specimens from much of the region intervening between the central Sierras and the Warner Mountains, and whether or not there is continuous distribution of bush-tits between is one of the points remaining to be worked out.

Sierra Nevada (specimens from Placer, Madera, Tulare, Kern, and Inyo counties). Fifty-one specimens are available from the general region indicated above. In this representation there are small series from two different points on the western slope of the Sierras, of particular interest when considered together. These are: Three males from Raymond, Madera County, taken April 19 and 20, 1911; and six males from Placer County: two adults, Blue Canyon, October 17 and 20, 1912; three immatures, Blue Canyon, October 17 and 20, 1912; one male, age not indicated, Gold Run, October 19, 1902. The Placer County birds have all nearly or quite acquired their fresh winter plumage, and may be considered as presenting the true colors of the subspecies *californicus*, unmodified

by any external influence. The Raymond specimens may be regarded as unquestionably illustrating the same plumage after subjection to the extreme effects of fading, but before excessive abrasion reduces all the feathers to the uniformly dirty and undistinctive appearance seen in midsummer specimens.

The differences shown in these two series is little less than startling, being quite as great, though of a different nature, than those distinguishing certain subspecies, or even species, in the genus. In the October birds the general effect is of dark gray and slaty tones, with no suggestion of brown anywhere. To speak exactly, the tops of the heads of these birds (as described elsewhere in this paper) are variously fuscous and chætura drab. In the Raymond (spring) birds the dark gray and slaty body colors have become a clearer gray above, and nearly pure white beneath, while the pileum is buffy-brown. With the two extremes brought suddenly to the attention, it is hard to realize that the observed differences are merely seasonal changes, such as are undergone by any one individual during the year; but that this is the case is forcibly proven by the comparable changes traced through the seasons in the extensive series of *minimus* from the San Diegan district, as previously described, as well as by certain examples of *californicus* showing intermediate stages.

Of the numerous specimens at hand from Tulare and Kern counties, in the southern Sierras, the majority are juveniles, and the comparatively few adults are either in very worn plumage or are undergoing the annual molt. The entire series, both old and young, shows to an extreme degree the pale coloration of this race, and placed in apposition to a comparable series of *minimus*, the difference is strikingly apparent. Sierran birds present the utmost degree of grayness reached in the subspecies *californicus*, equalled only by specimens from the Warner Mountains. Sacramento Valley birds are slightly darker, the difference being more noticeable in adults than in the young. Juvenals from the Sierras and from the Sacramento Valley are practically indistinguishable.

There are three specimens at hand (Richardson coll., nos. 1023, 1025, 1031) collected in the Piute Mountains, Kern County, November 26, 1907. This small mountain range is a southern outpost of the Sierra Nevada, and it is noteworthy that these birds, in fresh

fall plumage, are distinctly referable to the Sierran subspecies, *californicus*. The peculiar interest attaching to this occurrence lies in the fact that with certain other California birds comparable to the bush-tits in local divisions and distribution, we find at the extreme southern Sierras the southern California (San Diegan district) representative, rather than the more northern form. Two of the California towhees (*Pipilo maculatus megalonyx* and *P. crissalis senicula*), and a thrasher (*Toxostoma redivivum pasadenense*), are examples in point. In fact, from the preponderance of southern California forms in this region, the latest published map of the faunal areas of California (Grinnell, 1913, Plate XVI) shows the San Diegan district as extending northeast into southern Tulare County. With the bush-tits, however, the San Diegan representative, *minimus*, appears to be closely confined to the region west from, and inclusive of, the coastal ranges. Examples at hand from Fort Tejon and Mount Pinos are clearly *minimus*, apparently the northeastern extreme reached by the subspecies in this region. The Piute Mountain birds described above, are just as clearly *californicus*. These two stations are approximately sixty miles apart, and are apparently the two points at which the subspecies *minimus* and *californicus* most closely approach one another in this part of the state. The intervening region is mostly barren desert, unfitted to the species.

There are five immature birds at hand from Carroll Creek, Inyo County, this apparently indicating the northern limit of *californicus* on the eastern slope of the Sierras. Collecting was carried on at points immediately to the northward, where only *plumbeus* was found.

Psaltriparus plumbeus (Baird).

Type locality.— Little Colorado River, Arizona.

Range in California.— Desert region of the southeastern portion of the state, in Mono, Inyo, and northern San Bernardino counties. A discontinuous range, being confined to the Upper Sonoran zone of the various desert mountain chains and the east slope of the Sierra Nevada, these tracts being separated by vast expanses of Lower Sonoran, uninhabited by the species. Has been found in the Providence Mountains, on New York Mountain (at the east end

of the Providence Mountains), in the Panamint, Inyo, and White mountains, and on the east slope of the Sierra Nevada, from Carroll Creek at the south, northward an undetermined distance.

Specimens examined from the following localities.— Inyo County: Mazourka Canyon, Inyo Mountains; Carroll Creek, Lone Pine Creek, and Kearsarge Pass, Sierra Nevada. Total number of specimens, 10.

Distinguishing Characters.— Coloration of adults uniformly grayish throughout, with no distinctive markings. Upper parts gray; in fresh fall plumage the dorsum is tinged with olivaceous, in slight contrast to the head. No decided markings on head, though the cheeks are brownish, rather sharply defined against the gray of neck and white of throat. Under parts pale gra[illegible]tically pure white in worn plumage; the flanks frequently [illegible] with vinaceous. Juveniles are usually plainly marked as are the adults, but frequently exhibit head markings of varying extent and sharpness, similar to those seen in *P. melanotis.* In measurements, *plumbeus* as compared with *minimus* has wing and tail longer, tarsus the same, and bill (both in length of culmen and bulk) smaller.

Remarks.— Besides the California specimens listed above, there have been available for comparison series from southern Arizona and from Nevada, numbering thirty-seven and seventeen skins, respectively. These satisfactorily illustrate seasonal variation in plumage, and the series also contain a good representation of birds in juvenal plumage. The California specimens are for the most part absolutely like those from Arizona and Nevada. Birds from the Inyo Mountains and Kearsarge Pass, taken in May and June, are in worn breeding plumage, and are indistinguishable, either in color or measurements, from comparable examples from other regions.

Two specimens from the Sierra Nevada, however, are deserving of special notice. These are no. 22657, an adult male, taken on Lone Pine Creek, April 13, 1912, in comparatively unworn plumage; and no. 21092, also an adult male, taken on Carroll Creek, September 9, 1911, about two-thirds through the annual molt. The Lone Pine bird has a distinctly perceptible "cap" on the pileum, not nearly as marked as in full-feathered examples of *californicus* from the

Sierras, but little less distinct than in a single specimen from the Warner Mountains (no. 15297). In the Carroll Creek bird the cap is not so obvious, but might become more distinct with the completion of the molt. The measurements of both these birds coincide with those of *plumbeus* rather than *californicus*.

It will be noted that these specimens, of intermediate nature, were taken at the extreme southwestern limits of the range of *Psaltriparus plumbeus*. The ranges of this species and *P. minimus californicus* adjoin at this point, typical examples of the latter being taken at Carroll Creek, at the same time and place with the aberrant specimen of *plumbeus* described above. It will also be noted that one specimen of *californicus* from the Warner Mountains, previously described, shows a decided leaning toward the characters of *plumbeus*. In other words, at the one point where the ranges of *Psaltriparus plumbeus* and *P. minimus californicus* are known to touch, and at one other point, an extreme eastern outpost of the latter subspecies, we find specimens of intermediate character, with difficulty referred to either one of the two. This is suggestive of much closer relationship between them than has heretofore been suspected, and it may be that further collecting and observations in debatable territory will demonstrate the differences to be merely subspecific, necessitating a return to the trinomial, *Psaltriparus minimus plumbeus*, formerly in use.

At present, however, the facts hardly justify such a radical step. In the first place, the region of blending, even if its existence may be considered as established, is obviously very narrow, while the intermediate specimens are almost of the nature of hybrids. There is no *gradual* change from the characters of one species to the other, examples of *plumbeus* from the Sierras being for the most part indistinguishable from Arizona and Nevada specimens. It is of decided interest to note the existence of these doubtful specimens, as another example of the different kinds of intergradation, and varying degrees of difference, to be found between what we call species and subspecies of animals.

In commenting upon *P. plumbeus* at the eastern border of its range, where it meets *P. melanotis lloydi*, Ridgway (1904, p. 430, footnote) remarks: "The relationship of this form to *P. melanotis lloydi* affords a problem very difficult of solution and of exceptional

interest in connection with the discrimination between species and subspecies. Judging from specimens alone, it is difficult to escape the conclusion that the two forms intergrade completely; at least I find myself unable to satisfactorily refer a very large percentage of specimens obtained within the area of overlapping of their respective ranges. But Mr. Oberholser, who has had excellent opportunities of studying both forms in life, assures me that they not only both breed in the same localities in southwestern Texas, but that they each have distinctive peculiarities of voice, etc. It is true that apparent intergradation does not involve adult males, which are always very distinct, the difficulty being in distinguishing those females and some young examples of *P. m. lloydi* which have no black on the head from adults (both sexes) of *P. plumbeus.*"

These statements are partly applicable to conditions existing at the opposite, western border of the species' range, where *P. plumbeus* meets *P. minimus californicus*, in that, as shown above, specimens were found with difficulty referred to either species. It can not be urged in this case, however, that the two have any distinctive peculiarities of voice or habits serving to indicate specific difference, for in the writer's experience there are absolutely no such distinguishing characteristics. Also no evidence of intergradation in the juvenal stage is at hand, no undoubted example of *plumbeus* in juvenal plumage being secured in the debatable territory. The specimens regarded as intergrades are all mature birds. But as the young of *plumbeus* from other parts of its range exhibit characters remarkably similar to those of *P. melanotis*, it would be surprising to find them here developing features similar to *P. minimus.*

The whole problem of the inter-relationships of the three species of *Psaltriparus* is one of decided interest, the facts so far accumulated being of a suggestive, though tantalizingly inconclusive, nature. The three species have a continuous distribution, *melanotis* the farthest to the south and east, *minimus* to the north and west, and *plumbeus* occupying middle ground and impinging upon the territories of each of the others. *Melanotis* and *minimus* have peculiar and different head markings, while *plumbeus* is a plainly and uniformly colored bird. The interesting fact has already been developed (Swarth, 1913, p. 399) that in *plumbeus*, the middle link

in the chain, the young sometimes develop a startling similarity to the adult female, occasionally even to the adult male, of *melanotis*. From the present study it is evident that adults of *plumbeus* at a point of meeting with *minimus* are sometimes of the nature of intergrades towards this western form.

Ridgway (1904, p. 430) evidently strongly inclined toward a belief in the existence of intergradation between *melanotis* and *plumbeus*, and in the specimens discussed in the present paper there is shown apparent blending between *plumbeus* and *minimus*. This somewhat alters our conception of the relationships of the various forms of *Psaltriparus*, and results in a much closer linking together of the three generally recognized species. I have no intention here, however, of formally proposing the reduction of the known forms of *Psaltriparus* to subspecies under one species. We obviously cannot express all the inter-relationships of different forms in our nomenclature, and the generally accepted present treatment of the species and subspecies of the genus *Psaltriparus* seems more satisfactory than any such change would be. It seems evident though, that in the three forms, *melanotis*, *plumbeus*, and *minimus*, there are to be distinguished three branches of a parent stem which have diverged to a point where we are just able to detect traces of their former union.

Through some females and young of *melanotis* and young of *plumbeus*, we can observe apparent blending between these two, for the assumption of features of *melanotis* by the young of *plumbeus* would appear to be either a reversion to common ancestral characters on the part of the latter, or else it is a rather remarkable case of parallel development, with, in one species, greater specialization in the young than in the old, and specialization exactly such as is shown in a neighboring race. The former belief seems the more reasonable. The mergence of *plumbeus* and *minimus* is of an abrupt and broken nature. From these facts it seems as though the three 'species,' *melanotis*, *plumbeus*, and *minimus*, had advanced in their evolution to a point where the connecting links were almost eliminated, only faint traces of their former close union still being visible. The intermittent appearance of peculiar characters in the juvenal plumage of one of the species, and the occasional production of what appear to be hybrids, may be taken as evidence of this nature.

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MEASUREMENTS IN MILLIMETERS (AVERAGE, MINIMUM AND MAXIMUM) OF SERIES OF *PSALTRIPARUS*

	Wing	Tail	Culmen	Tarsus
Psaltriparus minimus minimus	46.8	52.05	7	15.8
10 males from Los Angeles Co., California	(46–48)	(50–54)		(15–16)
Psaltriparus minimus californicus	47.2	52.01	7.1	15.8
10 males from the Sacramento Valley, California	(46.5–49)	(50–54)	(7–7.5)	(15–16.5)
Psaltriparus minimus californicus	49.5	53.7	7.4	15.8
9 adults from the Warner Mts., California	(48–50.5)	(51–58.5)	(7.2–8)	(15–16.5)
Psaltriparus minimus californicus	47.8	52.3	7.1	16.3
5 adults from the Sierra Nevada, California	(47–48.2)	(51.5–54.5)	(7–7.2)	(16–16.5)
Psaltriparus plumbeus	51	55.3	6.1	16.3
8 adults from Inyo County, California	(50–52)	(52–59.5)	(6–6.5)	(16–16.5)
Psaltriparus plumbeus	50.4	55.05	6.1	15.6
10 males from the Huachuca Mts., Arizona	(49–51)	(53–57.5)	(6–6.5)	(15–16)
Psaltriparus plumbeus	51.3	55.5	6.1	16.1
5 adults from Humboldt County, Nevada	(50.5–52.5)	(53.5–60)	(6–6.5)	(16–16.5)

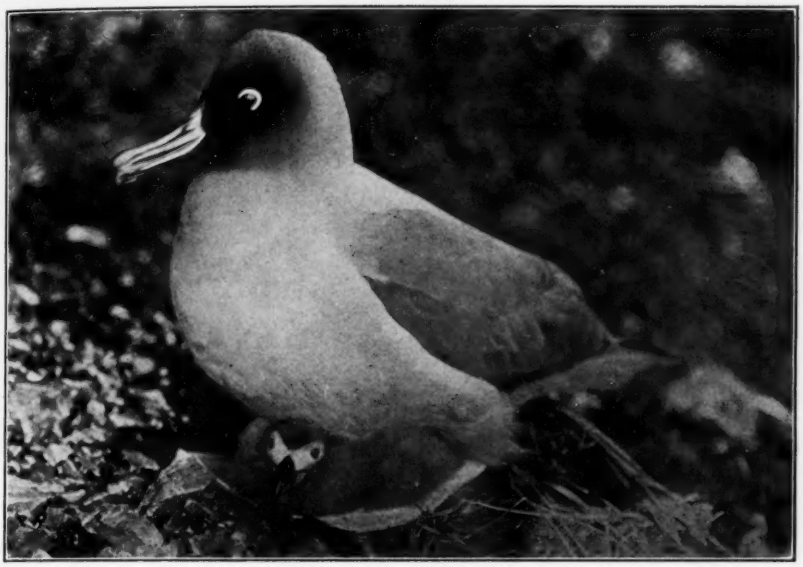
A REVIEW OF THE GENUS PHŒBETRIA.

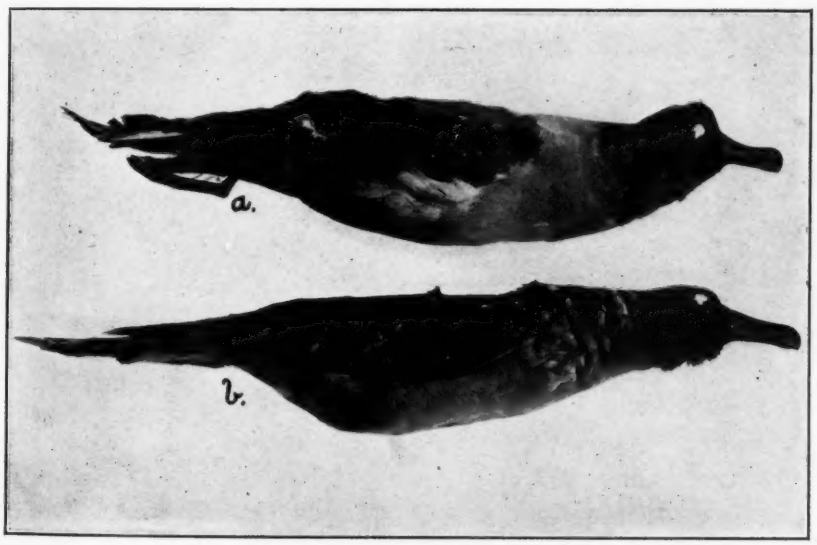
BY JOHN TREADWELL NICHOLS AND ROBERT CUSHMAN MURPHY.

Plate XLI.

THE possession by the American Museum of Natural History and the Brooklyn Museum of a series of skins of *Phœbetria palpebrata antarctica* from South Georgia Island in the Subantarctic Atlantic, and of two specimens of *Phœbetria fusca* from the temperate South Atlantic, has led us to assemble additional material for purposes of comparison. Our study brings us to the conclusion that the east Pacific, or American west coast, Sooty Albatross, which is the *Diomedea fusca* of Audubon and the *P. palpebrata* of the latest A. O. U. Check-List, (1910), belongs to an undescribed race of *palpebrata*. A review of the genus in the light of the material examined may aid future workers.

The characteristics which differentiate the two well-marked species *palpebrata* and *fusca* can be comprehensively stated in the form of a key:—





1. ADULT MALE AND NESTLING, SOUTH GEORGIA SOOTY ALBATROSS, *Phœbetria palpebrata antarctica.*
2. (a). *P. p. auduboni.* (b). *P. fusca fusca.*

A. Culmen concave in profile; sulcus of mandible narrow, and blue or purplish in life (dark in dried skins); feathers of back and lower parts decidedly paler than remainder of plumage. . *P. palpebrata*.

AA. Culmen nearly straight in profile; sulcus of mandible wide, and straw-color, yellow, or orange in life (and also in skins); feathers of back and lower parts dark like remainder of plumage. *P. fusca*.

Mr. Gregory Mathews in his 'Birds of Australia,' Vol. II, 1912, p. 294, has published diagnostic drawings of the bills of the two species.

P. palpebrata is the species having the more southerly breeding range, but its normal wandering range overlaps that of *P. fusca* in the southern temperate zone. Mr. Murphy has seen both together in the South Atlantic Ocean, and has found the specific differences striking in life. Curiously enough, the "common" Sooty Albatross (*P. fusca*), which is the '*P. fuliginosa*' of most authors, now seems to be a far rarer bird in collections than are representatives of *palpebrata*.

In naming three geographical races of the two species of *Phœbetria*, Mr. Mathews (*loc. cit.*) has failed to present adequate descriptions and measurements. Recently, however, Mr. Mathews has personally examined our own material, and has informed us that he studied a large series of topotypical specimens of *Phœbetria palpebrata* (Forster) before becoming sponsor for the subspecies *huttoni* and *antarctica*. We are therefore provisionally recognizing the following four races of *palpebrata* and two races of *fusca*, with the hope that some investigator who has series of Pacific and Indian Ocean birds at his disposal may soon make use of our measurements in fixing the status of the Old World forms.

Phœbetria palpebrata palpebrata (Forster).

Diomedea palpebrata, Forster, Mém. prés. Acad. Roy. Sci. (Paris), Vol. X, p. 571, 1785.

TYPE LOCALITY, lat. 64° S., long. 38° E.

RANGE, Kerguelen Island (breeding), also presumably the Prince Edward Islands, the Crozets, McDonald and Heard Islands, in the Indian Ocean.

Although the Kerguelen bird is the typical race of *palpebrata* it seems to be the intermediate between the two subspecies next considered, viz. *antarctica* of Weddell Sea and *huttoni* of the New Zealand region.

We have seen but one specimen, a breeding female from Kerguelen.

MEASUREMENTS IN MM.

	Bill	Tip of bill to nostril	Tarsus	Middle toe and claw	Wing	Tail
U. S. N. Mus. #68953 ♀ Kerguelen I.	103	72	78	118	502	275

Phœbetria palpebrata huttoni Mathews.

Phœbetria palpebrata huttoni, Mathews, Birds of Australia, Vol. II, p. 297, 1912.

TYPE LOCALITY, New Zealand seas.

RANGE, Subantarctic islands of New Zealand (breeding), Australian and New Zealand seas (Mathews).

Two specimens in the collection of the Museum of Comparative Zoölogy, Cambridge, Mass., have been compared with a large series of *antarctica* from South Georgia. In coloration the two subspecies bear close resemblances, but the New Zealand birds are perhaps slightly darker and notably smaller in all their dimensions.

Culmen moderately concave in profile, angular (*i. e.* with a well marked ridge) at its base. Groove of lower mandible narrow (cf. fig. Mathews, *l. c.*, p. 294). Head dark grayish-brown, darkest in loral region. Back and under surface ashy, rump darker than back.

MEASUREMENTS.

	Bill	Tip of bill to nostril	Tarsus	Middle toe and claw	Wing	Tail
Mus. Comp. Zool. #39880 ♂ New Zealand	95 mm.	65	76	112	502	221
Mus. Comp. Zool. #39881 ♀ New Zealand	101	69	79	119	486	245

Phœbetria palpebrata antarctica Mathews.

Phœbetria palpebrata antarctica, Mathews, Birds of Australia, Vol. II, p. 302, 1912.

TYPE LOCALITY, South Georgia (breeding).

RANGE, Weddell Sea and South Atlantic Ocean, north at least to 33° South (Murphy).

In this subspecies the bill is shaped much like that of the New Zealand and Kerguelen races, but it is larger and heavier, and the culmen is less acutely ridged at its base. The following description based upon breeding specimens of *antarctica* contains, of course, many characteristics common to its congeners:— Bill black, mandibular sulcus pearl blue; legs and feet pale flesh color with a vinaceous and buff wash over the scales; iris olive brown; skin of mentum blue under the feathers. Head dusky grayish-brown, nearly black on lores; a white ring, broken in front and on the anterior half of the lower lid, encircling eye; back and under surface ashy gray, blending with the dark shade of head, and lightest in center of back; rump and scapularies dark gray; wings dark brownish-gray, changing to grayish-black on primaries; tail grayish-black; shafts of quills white or whitish.

A nestling 336 mm. in length is covered with long light gray down except on the head, where a cap of short, dark gray down is separated from the nearly bare throat by a mask-like area of hairy, light gray down.

The nineteen specimens of this race, which we have had the pleasure of examining, were, with one exception, taken at South Georgia by Mr. Murphy or Mr. J. G. Correia.

MEASUREMENTS.

	Bill	Tip of bill to nostril	Tarsus	Middle toe and claw	Wing	Tail
J. G. C. #45, ♂ Cumberland Bay	116 mm.	75	83	125	506	267
R. C. M. #1745, ♂ Bay of Isles	115	75	84	122	519	263
J. G. C. #61, ♂ Cumberland Bay	116	80	86	131	552	274
J. G. C. #16, ♂ Cumberland Bay	117	76	81	121	519	284
R. C. M. #1507, ♂ Cumberland Bay	111	80	83	128	522	264
J. G. C. #43, ♂ Cumberland Bay	110	76	80	126	541	294
R. C. M. #1506, ♂ Cumberland Bay	110	76	81	122	518	279
J. G. C. #7, ♂ Cumberland Bay	110	78	83	122	523	275
J. G. C. #42, ♂ Cumberland Bay	109	77	85	128	521	270
R. C. M. #1528, ♂ Cumberland Bay	108	78	84	128	523	260
R. C. M. #1508, ♂ Cumberland Bay	103	75	82	120	503	249
J. G. C. #8, ♀ Cumberland Bay	117	76	81	125	506	265
J. G. C. #41, ♀ Cumberland Bay	114	73	82	125	525	276
J. G. C. #46, ♀ Cumberland Bay	114	73	84	122	521	274
R. C. M. #1527, ♀ Cumberland Bay	109	74	80	122	494	236
J. G. C. #39, ♀ Cumberland Bay	102	72	78	120	490	249
J. G. C. #40, ♀ Cumberland Bay	98	70	80	116	500	270
R. C. M. #1417, ♀ Lat. 50° S., Long. 35° W.,	116	75	80	122	526	251
R. C. M. #1744, ♂ fledgling in down, (tot. length 336 mm.)	51	33	40	48		

Below are averaged measurements of six males which were actually collected on their nests at South Georgia. The figures establish a standard of size for adult males of the subspecies *antarctica.*

	Bill	Tip of bill to nostril	Tarsus	Middle toe and claw	Wing	Tail
Average of 6 breeding males	113	78	83	125	525	272

Phœbetria palpebrata auduboni subsp. nov.

Diomedea fusca, Audubon, Orn. Biogr., V., p. 116, 1839.
TYPE LOCALITY, mouth of the Columbia River, Oregon.
RANGE, west coast of America, north casually to Oregon; breeding range unknown.

This is the most distinctive of the races of *Phœbetria palpebrata.* The specimen which of necessity becomes the type is No. 2718 of the United States National Museum collection, the type of Audubon's *Diomedea fusca* (not of Hilsenberg). This specimen is in a very bad state of preservation, with the head broken off, and the feathers soiled with grease in addition to having undergone the characteristic dimming of improperly prepared, aged specimens. From the color of its plumage it might be assigned to the *fusca* (Hilsenberg) group, where, indeed, Mathews (*l. c.*) and others have included it. The bill, however, shows that it not only belongs to the species *palpebrata* but to a race of that species which is farthest removed from *Phœbetria fusca.* The name which Audubon used being preoccupied by *fusca* of Hilsenberg, we have proposed the name *Phœbetria palpebrata auduboni.*

Since the type is of such limited value for purposes of comparison, it is fortunate that we have found another specimen in the Museum of Comparative Zoölogy, No. 3903 collection of E. A. and O. Bangs. The latter bird agrees with the type in its dimensions and approximately in the shape of the bill, and also presents what was doubtless the original coloration of the type.

Subspecific distinctions: bill more slenderly built and more strongly hooked than in other races of *palpebrata;* culmen more decidedly concave or 'saddle-shaped,' the ridge at the base high and acute. Head fuscous-black, darkest between eye and bill; back and underparts dark gray, rump still darker; wings and tail brownish-black.

The Bangs specimen is reasonably fresh, so that its plumage is comparable with our own material. The bird is much darker than any specimens of *antarctica* or *huttoni,* though nearer in coloration to these than to *fusca.* Possibly *auduboni* has a more northerly breeding area than the other members of *palpebrata,* in which case its darker plumage would conform with a recognized color principle among sea birds of the southern hemisphere.

MEASUREMENTS.

	Bill	Tip of bill to nostril	Tarsus	Middle toe and claw	Wing	Tail
Type of "*D. fusca*" Aud. U. S. Nat. Mus. #2718 (no sex) Oregon	108 mm.	76	84	124	495 much worn	251
Coll. of E. A. & O. Bangs #3903 (no sex) "Between Cape Horn & San Francisco."	105	75	81	120	502	248

Phœbetria fusca fusca (Hilsenberg).

Diomedea fusca, Hilsenberg, Froriep's Notizen, Vol. III, No. 5 (49), p. 74, 1822.

TYPE LOCALITY, Mozambique Channel.

RANGE, South Atlantic and western Indian Oceans, Tristan de Cunha and Gough Islands (breeding), Prince Edward Islands (?) and the Crozets (?).

This species is the *P. fuliginosa* of authors and is differentiated from the *palpebrata* group by the characters given in our key, p. 527. In life its most conspicuous mark is the absence of a gray mantle. Our only specimens are two collected by Mr. Murphy on March 26, 1913, lat. 39° S., long. 31° W., Atlantic Ocean.

Plumage in general sooty black, slightly paler and grayer below, brownish on crown and middle of back. Bill deep and straight (see Mathews' Fig.), less strongly hooked than that of *palpebrata;* ridge at base of culmen slight; broad mandibular sulcus yellow; iris olive; white crescent bordering eye, and whitish quill shafts, as in other members of the genus.

MEASUREMENTS.

	Bill	Tip of bill to nostril	Tarsus	Middle toe and claw	Wing	Tail
R. C. M. #1952, ♂	112 mm.	80	82	123	481	265
R. C. M. #1953, ♀	110	76	83	120	497	237

Phœbetria fusca campbelli Mathews.

Phœbetria fusca campbelli, Mathews, Birds of Australia, Vol. II., p. 304, 1912.
TYPE LOCALITY, "Australian seas."
RANGE, Australian seas (Mathews); breeding range unknown.

On its present basis this subspecies is hardly worthy of recognition for Mr. Mathews states simply that it is smaller in all its dimensions than the western, typical race. Comparing our measurements of *fusca fusca* with those given by Mathews for *fusca campbelli,* we find notable differences only in the length of the tarsus. We have seen no specimens from the reputed range of this subspecies.

CONCLUSIONS.

Summarizing our conclusions on the genus *Phœbetria*, upon the not wholly sufficient basis of the material studied, we find in the first place two well differentiated species, *palpebrata* and *fusca*, of more southerly and more northerly distribution respectively, but of coincident range in an intermediate zone. The last generalization may not hold true in the eastern Pacific, where the only known representative, *Phœbetria palpebrata audubonì*, may have become part of the fauna of the northern hemisphere in accordance with the general tendency of the Diomedeidæ to range northward in that ocean.

The species *palpebrata* is in turn divided into two main sections, one of which includes only *audubonì* with a range west of America and Weddell Sea, the other comprising the three pale subspecies *antarctica*, *palpebrata*, and *huttoni*, ranging from west to east, respectively, across the Atlantic and Indian Oceans, to the waters south of Australia, and forming in the same order a decreasing sequence in size. These three subspecies have a range in latitude extending from the verge of the true Antarctic at least to the middle of the southern temperate zone. It seems possible that the ranges of *huttoni* and *audubonì* may be separated by the vast stretch of the southern Pacific, where the little known Dougherty Island in latitude 59° S., alone offers even an unlikely possibility as a breeding ground.

The species *fusca* is represented by the typical race which inhabits the temperate southern Atlantic and Indian Oceans, over an area having its longitudinal center in the neighborhood of the Cape of Good Hope; and by a geographically separated race, *campbelli*, not yet properly known to science, with a range in the Australian seas.

EXPLANATION OF PLATE.

Fig. 1. *Phœbetria palpebrata antarctica* Mathews, adult ♂ and downy nestling, Bay of Isles, South Georgia, Jan 20, 1913. Photo by R. C. Murphy.

Fig. 2. *a*, *Phœbetria palpebrata audubonì* Nichols and Murphy, No. 3903 Coll. of E. A. and O. Bangs, sex undetermined, Eastern Pacific Ocean. *b*, *Phœbetria fusca fusca* Hilsenberg, No. 1952 ♂, R. C. Murphy, South Atlantic Ocean.

GENERAL NOTES.

Harlequin Duck in Glacier National Park, Montana.— June 27, 1913, I had the pleasure of observing a pair of Harlequin Ducks (*Histrionicus histrionicus*) on Iceberg Lake, in the Glacier National Park, Montana. The lake, it may be stated, is so called because there is a small glacier coming down to the water's edge at one side, from which, during the summer, pieces of ice are frequently breaking off and floating about in the water. At the time of my visit, however, the lake was mostly covered with ice and snow, merely a narrow strip of open water 40 or 50 feet wide along the side opposite the glacier, and in this the brightly clad drake and his more quietly dressed mate were swimming back and forth. They were comparatively tame and paid little attention to me as I stood on the shore and watched them, though they kept in motion continually. The only time they took wing was to fly over a narrow bit of ice which separated the strip of water into two parts, and then they only flew far enough to pass over the ice and dropped back into the water again; later I saw them get out and walk over the same ice. While I was equipped with a Graflex camera, the day was very dark and cloudy, raining occasionally, and I did not succeed in getting a single good negative owing to the fact that I had to make very short exposures because of the birds being constantly in motion and passing the line of sight at right angles. Even the strong reflection from the ice and snow did not help out sufficiently. It was the chance of a lifetime and I will never cease to regret not having obtained good pictures. I am very curious to know if the birds bred there. Perhaps this may meet the eye of someone who saw them there later in the season.— Edward R. Warren, *Colorado Springs, Colo.*

American Egret (*Herodias egretta*) **at Naushon Island, Mass.**— I was much interested in Mr. Noble's note in the January 'Auk,' on the American Egret at Martha's Vineyard. I saw an American Egret fly over the northeastern end of Naushon Island on July 20, 1913 while I was there for a visit. On August 11, 1913, when returning from Nantucket my husband and I saw two American Egrets standing at the edge of a green marsh between Wood's Hole and Falmouth. These birds looked gleaming white with the green marsh background.— Lidian E. Bridge, *West Medford, Mass.*

Yellow-crowned Night Heron in Colorado.— The writer has to report the occurrence of this species (*Nyctanassa violacea*) at Byers, Colo., where one was shot on May 3, 1914; the bird was in full nuptial plumage, and was brought (in the flesh) to Mr. A. T. Allen, taxidermist, of Denver, Colo., to be mounted. Through his courtesy the writer is able to make this valuable record, which is, so far as he knows, the second for this state for this species, and the first one with full data as to location of occurrence, and date of collection. The sex was not determined.— W. H. Bergtold, *Denver, Colo.*

Red Phalarope (*Phalaropus fulicarius*) **off Boston Harbor in Summer.**— On July 11, 1913, when Miss Cleveland, local secretary of the Massachusetts Audubon Society, and I were returning by boat to Boston, from Plymouth, a small duck-like, brightly colored bird caught my eye just as the boat passed the Harding's Ledge buoys just outside Boston Harbor. We examined the bird carefully with our glasses, and it proved to be a Red Phalarope in full plumage, the first of the kind we had ever seen, but we had good views and were able to positively identify it.— LIDIAN E. BRIDGE, *West Medford, Mass.*

Another Massachusetts Record for the Turkey Vulture (*Cathartes aura septentrionalis*).— On July 24 of this year, I was watching a Red-tailed Hawk over Higgins' Pond in Truro, Cape Cod, Mass., when a large black bird appeared from the southeast and flew with slow wing-beats across the pond, rather low and at no great distance from me, and then mounted soaring into the air. Though I had become familiar with the Turkey Vulture on a visit to Virginia some years ago, I did not at once recognize it in Massachusetts, where this species does not ordinarily come into our reckoning, but soon the size, color, long outstretched wings with the tips of the primaries well separated, and comparatively long, rounded tail identified the bird positively as *Cathartes aura* and presumably of the subspecies *septentrionalis*. Presently it dropped to a lower level and sailed straight on motionless wings in the direction of Slough Pond, half a mile away to the north. On reaching Slough Pond, I failed to find the Vulture but startled an immature Bald Eagle from its perch on the farther shore, and while watching it move off in circles towards the west, I saw two other soaring birds in the distance, probably the Red-tailed Hawk and the Turkey Vulture. Meeting with these three fine birds in such close succession, each one larger than the last, was an interesting experience, and the Turkey Vulture is uncommon enough in Massachusetts to make it seem worth while to record the occurrence.— FRANCIS H. ALLEN, *West Roxbury, Mass.*

Richardson's Owl (*Cryptoglaux funerea richardsoni*) **in N. E. Illinois.**— Richardson's Owl rarely strays as far south as the United States, and after more than forty years collecting I had never seen a specimen in the flesh, until one was brought into the shop of Mr. R. A. Turtle, the taxidermist, who very kindly presented it to me. It was picked up dead in the street — Data from label: "Mus. H. K. C., No. 17479 — ♀ Chicago, Illinois, March 5, 1914 — Length 10.25 in., Extent 24.25, Wing 7.25, Tail 4.38, Tarsus .80, Bill .75. Stomach empty —" The only other Illinois records are Rockford, October, 1884, Cicero, December, 1902, and Kenilworth, December, 1902, all near Chicago.— HENRY K. COALE, *Highland Park, Ill.*

Unusual Behavior of a Ruby-throated Hummingbird (*Archilochus colubris*).— On August 22, 1914, my wife and I were coming through the extensive piece of swamp-land just east of Chain Bridge in the District of

Columbia. It was nearly sundown, and the place was gathering on the evening shadows, when, within a few feet of where we stood resting for some moments, there suddenly appeared a male hummingbird (*A. colubris*) in hot pursuit of a Carolina Wren (*Thryothorus l. ludovicianus*), the latter leading it a pretty chase through the trees and dense vegetation. Both were giving vent to their peculiar notes indicating their excitement, while the hummer seemed bent on doing the wren any bodily harm it could effect with its bill. Once or twice it lit close to us, and the scolding notes of the wren brought two other birds of the same species to the scene. These were likewise immediately charged by the valiant little hummer with great vehemence, which uttered as it did so its little, shrill, squeaky pipings. All three of the wrens kept dodging these attacks, and it was remarkable to see the skill with which the hummer shot about after each in turn through the vines and small branches of the trees and shrubs.

In a few moments, several warblers put in an appearance, among them a Maryland Yellow-throat (*Geothlypis t. trichas*), a couple of Parulas (*Compsothlypis a. americana*), a Magnolia (*Dendroica magnolia*), and others which I could not with certainty identify, on account of the increasing darkness. Their arrival seemed to still further excite the hummingbird, which shot first after one, then after another according to their accessibility. In no instance, however, did I actually see it come in contact with the bird attacked, and always on account of the skill of the latter dodging a direct charge; for beyond such linear flights, the hummer could only buzz for a few seconds about the bird he was particularly after in any attack. Neither the wrens nor the warblers made any counter charges, while the entire affair did not last over a minute or two, when both assailant and the assailed flew off in different directions.

Never before in my life have I witnessed such a scene; and I can not conceive what could have occasioned a hummingbird to behave in such a manner.— R. W. Shufeldt, *Washington, D. C.*

Breeding of the Red-winged Blackbird (*Agelaius phœniceus phœniceus*) **in Nova Scotia.**— On June 21, 1914, after repeated searching, I found the nest of the Red-winged Blackbird (*Agelaius phœniceus phœniceus*) in a swamp near Antigonish, Nova Scotia. It was attached to cattail stems and rank grass, and was placed six or eight inches above the surface of water in which I stood knee-deep. It contained four eggs, corresponding exactly in appearance with the description of the eggs of this species given in F. M. Chapman's 'Handbook of Birds of Eastern North America,' 1912 edition. Unfortunately, I did not actually see the female at the nest, but she and a male fluttered over my head, or perched in the nearby bushes while I was examining the nest. They uttered many cries of distress and anger, and I consider that their actions, together with the situation and appearance of the nest and its contents, indubitably determine its identity. I did not collect it, as I did not wish to disturb the birds in any way. A second pair of the same species was present in this swamp and presumably

bred there. A male of the species was seen in the swamp on May 2, 1914, and one or more of the birds was observed there occasionally up to the time of finding the nest.

The following may also be of interest in this connection. On June 29, 1914, one male and two female Red-winged Blackbirds were observed in a cattail swamp near Truro, Nova Scotia, and probably within the limits of the town. The birds were easily and positively identified and presumably were breeding there. I can find no previous record of the breeding of the species in Nova Scotia.— HARRISON F. LEWIS, *Yarmouth, Nova Scotia.*

Brewer's Blackbird (*Euphagus cyanocephalus*) **breeding in Southeastern Minnesota.**— It has long been definitely known and of late years frequently recorded that Brewer's Blackbird regularly nests in considerable numbers in *northwestern* Minnesota, especially throughout the valley of the Red River of the North and the region immediately adjacent to the eastward. A few scattered observations confirm its occurrence as a migrant further east in the state: — White Earth, Becker Co. April 6, 1885, W. W. Cooke, (Rep. Bd. Migr. Miss. Val. 1888, pp. 173–4); Bemidji, southern Beltrami Co., September 8, 1902, (L. O. Dart, MS. List); Parker's Prairie, southeastern Ottertail Co., "found here and breeds but is rather scarce during the breeding season," (Fred Barker, MS. List); and from still further eastward comes to the Minn. Nat. Hist. Survey a report from Rev. Severin Gertkin that "many" were seen on April 9, 1894, and "a small flock" on April 3, 1897, at Collegeville, in eastern Stearns County, a locality about fifty miles south of the geographical center of the State.

Dr. P. L. Hatch in his 'Notes on Minnesota Birds' 1892, p. 286, has the following to say in regard to the breeding of this blackbird in Minnesota: "They breed abundantly along the Red River from Big Stone lake to the Canadian line, and eastwardly along the shores of the woodland lakes and streams to Mille Lacs in Crow Wing county, and less commonly considerably further south." But the latter, and most important, part of this statement is unsupported by actual data and nothing up to the present time has been recorded to substantiate the presence of this blackbird east of the extreme western part of the State in the breeding season. Therefore the present circumstantial account of a nesting colony of Brewer's Blackbirds at a locality only thirty miles west of the eastern boundary of Minnesota is perhaps worthy of being placed on record, more especially as it is, as far as I can discover, the most eastern locality where it has been found nesting anywhere in its range.

The place where the birds were found is a swampy meadow of some two hundred acres in extent, resulting from the drainage, a few years ago, of a shallow lake or slough, called Palmer's Lake, a famous resort in times gone by of many kinds of wild fowl and marsh birds. It lies close to the northern limit of the city of Minneapolis. The discovery of the colony was made by Mr. F. H. Nutter on May 13 of the present year, 1914, while surveying this lake bed. Mr. Nutter has for many years been an earnest and intelli-

gent student of our birds and credit is due him for recognizing at once a bird that he had never seen alive before and had no reason to expect to find here. With characteristic modesty he kindly delegates to the writer the making of this report. On the date just mentioned Mr. Nutter found seven nests, all containing eggs. Four sets were collected and deposited in the collection of the Minnesota Academy of Sciences, which institution was the recipient several years ago, of Mr. Nutter's entire collection of eggs and nests. The eggs were prepared by Mr. J. W. Franzen, Curator of the Academy's Museum and proved to be partially incubated, indicating that nesting had been begun in the very early part of May.

On May 22, the writer accompanied by Mr. Nutter and Mr. Franzen, visited the blackbird colony, examined the nests found by Mr. Nutter and after a little search discovered four additional nests in the immediate vicinity of the others. All contained eggs, four or five in number.

On May 30, I again visited the locality in company with Mr. William Kilgore, another ardent student of bird life. Two more nests were found at this time. All the nests contained young birds just hatched except one of those found on the twenty-second in which there were still five unhatched eggs. So far as our observations went at this time the females alone were carrying food to the young.

On June 17, Mr. Franzen and myself again visited the marsh and found all the nests empty, except the one containing eggs on the thirtieth which had been abandoned before the eggs hatched, one of the original clutch of five being missing and two of the remaining four being broken. The young had apparently flown from the other nests, but neither parents nor young were to be found in the vicinity. This was a disappointment as we were equipped with an umbrella blind and photographic outfit. However, on the edge of the marsh a half mile away and close by a farm house, were found a number of birds where a small accessory colony had been located on the twenty-second. Here the birds were flying about in a bit of fenced-in marsh and in the tops of a grove of trees adjacent to the farm house. Four were shot and one of these proved to be a young of the year nearly full grown. A female contained an egg just about to be laid, suggesting that a second or belated nesting was in progress. One female was seen carrying food but no nests were discovered here. This small colony may possibly have been composed of the birds disturbed on May 13 in their nesting operations at the main colony out in the middle of the marsh.

Thus thirteen nests were found in all. We estimated that probably twenty or twenty-five pairs of these blackbirds were nesting in this marsh, chiefly in one colony, or rather two closely related colonies, the nests grouped rather closely about two foci, some five hundred paces apart. The spot selected was out in the middle of the meadow but close by a thick new growth of willows fringing the main drainage canal. The nests were all rather bulky affairs, on the ground and sunk to the rim in the soft marsh soil and without exception each was placed close to the base of a clump of Marsh Marigolds (*Caltha palustris*). When the nests were first built

they must have been protected only by the early flowering Marigolds for when discovered by Mr. Nutter on May 13, the grass was but just springing up, the bog being still frozen hard at a depth of only a foot or so from the surface, as was discovered on attempting to drive surveyor's stakes. By the twenty-second the grass was nearly knee high but was still overtopped by the Marigolds and the marsh was yet gay with the golden blossoms. By the time the parents ceased their nesting duties their domiciles were hidden at the bottom of a miniature forest of luxuriant meadow grass and marshy plants, more than waist high, with all the original land marks obliterated and not a vestige of the early Marigold shelter to be seen.— THOS. S. ROBERTS, *Minneapolis, Minn.*

Southern Meadowlark (*Sturnella magna argutula*) **in Northern Illinois.**— In November, 1913, it was my good fortune to attend the Annual Meeting of the A. O. U. in New York City, and later to inspect a number of collections of birds in the New England States.

At different points Meadow Larks were seen, some flying up quite near the train.

These birds appeared to be much larger than those of northeastern Illinois. This was verified upon examining some Massachusetts specimens in Mr. Hersey's collection at Taunton; their large size as compared with Illinois birds at once attracted my attention. Mr. Hersey and Mr. C. L. Phillips of Taunton sent me some skins of the Massachusetts birds. Later in looking over the skins of birds taken in Illinois, and on comparing them with true *Sturnella magna argutula* from Florida, I found them to be identical. Whether the type of *Alauda magna* Linn. was this subspecies, or represented the large New England *Sturnella magna*, I am not able to say, but the species which breeds in northern Illinois and adjacent states is not true *magna* as has been supposed, but *argutula*. The measurements following are from specimens in my collection referred to *Sturnella magna*.

Sturnella magna.

(Measurements in inches).

H. K. C.				Length of Skin	Wing	Tail	Tars.	Bill	Mid. toe
16850	♂	Chathamport Mass.	Jan. 29, 1913	10.5	5.00	3.63	1.63	1.25	1.60
16793	♂	" "	Nov. 22, 1913	10.25	5.00	3.60	1.63	1.25	1.60
16794	♀	" "	" "	10.15	5.00	3.70	1.62	1.30	1.60
			Sturnella magna argutula.						
10473	♂	Highland Park, Ill.	Apr. 2, 1906	8.50	4.60	3.15	1.48	1.20	1.10
9537	♀	" " "	" 25, 1905	8.00	4.40	3.00	1.45	1.15	1.10
12692	♀	Lukeus, Fla.	Jan. 10, 1906	8.30	4.35	3.00	1.50	1.20	1.20
12691	♂	St. Marys, Ga.	Feb. 19, 1903	8.60	4.65	3.00	1.50	1.30	1.40

HENRY K. COALE, *Highland Park, Ill.*

Evening Grosbeaks at Jamaica Plain, Mass.— In the April number of 'The Auk,' Mr. Edward H. Atherton reports an Evening Grosbeak (*Hesperiphona vespertina vespertina*) in the Arnold Arboretum. The bird remained for about six weeks the last date of observation being February 8, 1914.

This however was not the only appearance of this species in the Arboretum this season. On March 15, 1914, with Mr. Ralph M. Harrington of Cambridge, Mass., and the writer saw two fine males and one female in the river birches near the superintendent's house where they were feeding on the seeds. The males were uttering low whistling notes. The female was much darker than the bird noted by Mr. Atherton. They were seen several times in about the same place for just a month (March 15–April 15). A number of times two males and one female were observed at Quincy, Mass., and on those identical dates the birds were not to be found in the Arboretum. Were they the same birds? The two places are only about eight miles apart.— HAROLD S. BARRETT, *Jamaica Plain, Mass.*

Chestnut-collared Longspur in Colorado.— I have to record the occurrence of a single male of this species (*Calcarius ornatus*) at Denver, Colo., on June 17, 1914. This species is an extremely rare summer visitor to Colorado; the individual seen on June 17, being the first and only one seen in the state during more than twenty years' residence in Colorado.— W. H. BERGTOLD, *Denver, Colo.*

The Snow Bunting Again in the Chicago Area.— In a previous number of 'The Auk' [1] I reported a few records of the Snow Bunting seen by me in Chicago and vicinity during the fall and winter of 1912, the interest being that the species is a supposedly irregular visitant here. In 1913 a few birds again appeared, from one to nine being observed at Jackson and Lincoln Parks, Chicago, from October 17 to November 22 inclusive. As did the birds of 1912 these disappeared as soon as the beaches had become covered with ice. No more were seen until February 21, 1914, when about twenty appeared at Lincoln Park, not about the beaches, but feeding over newly made land some distance away.

While it is generally believed that the Snow Bunting is an irregular winter visitant to this region, it is more probable that it is a regular one. The records of another observer, J. H. Ferry, who states that the species is locally a common winter resident here, tend to support this view.[2] Unless one makes many excursions to various localities he is likely to overlook the birds entirely, as they do not, according to Mr. Ferry's observations and my own, remain long in a single place.

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[1] Auk 30: 275. 1913.
[2] Auk 24: 127. 1907.

It is possible that the birds were once irregular here, but have since become regular, owing to good beaches, their favorite habitat, being formed along the west shore of Lake Michigan by the building of piers which has checked erosion in many places, and offered a favorable path of migration where formerly there were eroding bluffs. It should be noted, however, that the birds may spread westward from Michigan, where W. B. Barrows[1] reports them as regular, and where the lake shore offers an exceedingly favorable habitat. In this case they may either fly directly across the lake, or make their way westward along the Indiana shore, where, as in Michigan, there are excellent beaches.— EDWIN D. HULL, *Chicago, Illinois.*

Nevada Savannah Sparrow in New Mexico.— On October 19, 1913, the writer secured an individual of this subspecies (*Passerculus sandwichensis nevadensis*) at the G. O. S. Ranch, on the headwaters of Sapillo Creek, N. Mexico. This record, unless the writer reads incorrectly, extends the range of this subspecies considerably eastward. The writer has to acknowledge, with thanks, the kindness of Mr. W. DeW. Miller of the American Museum of Natural History, who diagnosed the skin on which this record is based.— W. H. BERGTOLD, *Denver, Colo.*

A Second North Carolina Record for Lincoln's Sparrow (*Melospiza lincolni lincolni*).— On May 14, 1914, I obtained a superb adult male of the above species at Morganton, Burke County. This bird was alone, and very shy, and was captured with difficulty. The song bore a strong resemblance to the song of the House Wren. This specimen is now in my collection.

The first record for North Carolina was based upon a bird taken on May 6, 1893, at French Broad River near Alexander's by the late John S. Cairns and recorded by J. W. P. Smithwick, Bull. 144, N. C. Agricultural Experiment Station, 1897, p. 218. This specimen is now in the collection of Mr. William Brewster, and was given to him by Mr. Cairns.

Lincoln's Sparrow is evidently a regular migrant through the Piedmont region of North as well as South Carolina, but as yet there is no record for South Carolina.— ARTHUR T. WAYNE, *Mt. Pleasant, S. C.*

Bell's Vireo in Wisconsin.— On June 28, 1914, while walking through a clump of willows near Wingra Lake, Madison, Wis., I heard the song of a bird which I was not able to identify. Observation of the bird indicated a vireo and with that clue I believed that I could recognize the song of Bell's Vireo which I had heard several years ago. A second visit with Mr. A. W. Schorger was made on July 1. The bird was found and was again singing but disappeared before he could be collected. On July 3 Mr.

[1] Michigan Bird Life, 1912, p. 485.

Schorger visited the place and fortunately found the bird still present. He collected it and it proved to be an adult Bell's Vireo. The specimen was forwarded to the Biological Survey for examination and from their records as well as those of the Kumlien and Hollister list of 1903, it appears to be the first specimen of Bell's Vireo taken in Wisconsin. It is now in Mr. Schorger's collection — No. 46.

Although the bird acted as though established, remaining in one locality and singing frequently, no signs of a mate or of a nest could be found. It seems probable from the size of the testes and his continual singing that this was an unmated bird and that his presence here does not indicate a breeding record.— NORMAN DEW. BETTS, *Madison, Wisc.*

San Lucas Verdin (*Auriparus flaviceps lamprocephalus*) **in California.** — I take pleasure in recording the capture of the Cape Verdin north of the Mexican Boundary.

Some time ago I received from Mr. L. E. Wyant of Los Angeles, a pair of Verdins which were taken by Mr. H. Wright at Mecca, Cal., March 19, 1911.

These birds were so much smaller and lighter than others in my collection that I sent them to Mr. Harry C. Oberholser for positive identification, which proved them to be as I surmised, *Auriparus flaviceps lamprocephalus*. They are smaller and lighter in color than the Verdin from Texas. The type, (No. 117551 Coll. U. S. Nat. Mus.) was taken by C. H. Townsend, at Cape San Lucas, Lower California, April 7, 1889 and described by Mr. Oberholser in Vol. XIX of 'The Auk' in 1897. Specimens in my collection measure as follows:

Auriparus flaviceps.

H.K.C.				Skin	Wing	Tail	Tr.	Bill
9326	♀	Chochise, Ariz.	Mch. 18, 1890	4.10	2.25	2.05	.75	.38
11504	♂	Rio Grande, Tex.	Apr. 12, 1880	4.20	2.20	2.15	.70	.37
		A. flaviceps lamprocephalus.						
16776	♂	Mecca, Cal.	Mch. 19, 1911	3.87	2.10	2.00	.62	.31
16777	♀	" "	" "	3.85	2.	1.95	.62	.30

HENRY K. COALE, *Highland Park, Ill.*

Notes from Springfield, Mass.— Anas platyrhynchos.— Sixteen years ago about a dozen Mallard Ducks were placed in Forest Park, a public reservation in Springfield, bordering on the Connecticut river, consisting of about four hundred and sixty acres of land, and containing a

number of small ponds and streams. For the first few years after their introduction into the park, these Mallards were kept in confinement for a portion of the time, and wandered at pleasure only when their wings were clipped, but during later years they or their descendants have been free to go and come as they pleased, with unclipped wings. Many of these ducks have bred in the park, and others have disappeared in the spring and reappeared in the autumn in increasing numbers. Last winter, at one time, the park contained between sixty and seventy of these ducks. This year and last several nests of Mallards have been found in the vicinity of Springfield, but a number of miles from the park. In former years this species of duck was not known to breed in Massachusetts, although it was a regular migrant in the western part of the state, appearing in spring and autumn on the waters of the Connecticut river and its tributaries in more or less numbers.

Florida cærulea.— On the twenty-second day of July, of the present year, a Little Blue Heron, in its white plumage was captured in West Springfield.

Ixobrychus exilis.— On the seventeenth day of last June a nest of a Least Bittern, containing four eggs, was found in Longmeadow. This is the only record of the nesting of this species in the vicinity of Springfield.

Corvus ossifragus.— On the tenth of last April a Fish Crow was seen in Forest Park in Springfield. Only on very rare occasions do representatives of this species of bird come up the Connecticut valley as far as this point. While the bird in question was not taken, a very close inspection was had, and the observers were guided to the vicinity of the bird by the easily identified notes that it uttered.

Icterus galbula.— In the latter part of last autumn a Baltimore Oriole appeared in a thickly settled residential portion of Springfield, and remained in that vicinity until the latter part of December, an interesting sight to many observers.— ROBERT O. MORRIS, *Springfield, Mass.*

West Virginia Notes.— Bonasa umbellus umbellus.— While on an observation trip in the Rich Mountains of West Virginia, May 15 to 18, 1914, Mr. Orr R. King saw several Ruffed Grouse with their young. In the spruce forests of those mountains and in the 'cut-over' areas these fine game birds are still quite common. In many parts of our state the Ruffed Grouse is becoming rare.

Cathartes aura septentrionalis. A few years ago the Turkey Vulture was abundant in all the interior region of West Virginia. Now it has become quite rare in the central hill region of the state, but is common east of the mountains.

Dryobates villosus villosus.— During the first week of June, 1914, with two assistants, I made a trip to the Cranberry Glades, at the head-waters of the Cranberry River. This is a region of unusual interest as may be seen by some of the notes that follow. Among the Woodpeckers to be found in the great forests and the 'cut-over' areas the Hairy Woodpecker was by

far the most common of all. Evidently breeding all through the mountains at the head of Cranberry, Greenbrier and Cheat Rivers.

Chætura pelagica.— A curious nesting habit of the Chimney Swift was observed at the foot of Kennison Mountain, Pocahontas County, at the lower end of Cranberry Glades. A woodsman told us that these birds sometimes nest among the rocks and in abandoned lumbermen's shanties. While we found no nests among the rocks, we did find several nests in an old house which the lumbermen had used some years before. This particular building had been used as a blacksmith's shop. The nests were glued to the boards on the wall in the attic of the building. The presence of quite a number of these birds in the vicinity of these old lumber camps seemed to indicate that this is a common mode of nest-building in these mountain regions.

Nuttallornis borealis.— Four or five pairs of Olive-sided Flycatchers were observed in the region round about the glades. The males kept constantly in the highest tree-tops. On account of the date and the actions of the birds we concluded that they were soon to begin nest-building, though no nests were found.

Empidonax trailli alnorum.— Several Alder Flycatchers were heard and seen in the dense alder thickets among the glades. The males were uttering their characteristic notes. Several old nests were found in the alder bushes, but no nests of this year. A fine male was taken on June 3. The measurements of this specimen were as follows — Length, 5.58; wing, 2.90; Tarsus, .77; tail, 2.30; bill from nostril, .34. The greatly enlarged testes of this specimen indicate that the nesting season was just about to begin.

Empidonax minimus.— The Least Flycatcher was found in great abundance throughout all the mountain region about the head-waters of the rivers mentioned above. Three nests were found, each with four white eggs.

Corvus corax principalis.— On three different occasions a flock of four Northern Ravens was observed flying over the mountains in the region about the Cranberry Glades. On the fourth of June we were on the top of Black Mountain, about 4,600 feet above sea level, and the four Ravens came down in an open field near by. One Raven was observed on the Shaver's Fork of Cheat a few days later.

Chondestes grammacus grammacus.— On May 15, 1914, a nest of the Lark Sparrow was found by Maurice G. Brooks at Frenchton, West Virginia. The nest contained four fresh eggs. Because of some disturbance the birds left the nest and the eggs were collected (only three of them being preserved), and are now in the collection of Orr R. King. The measurements of these eggs are as follows — No. 1, .72×.59; No. 2, .73×.60; No. 3, .77×.61.

Peucæa æstivalis bachmani. A nest of the Bachman's Sparrow was found near French Creek, West Virginia by Paul Cutright in July, 1913. One infertile egg was left in the nest after the young birds had flown.

This egg, the first one taken in West Virginia, is now in the collection of Orr R. King, Weston, W. Va. During the past ten years this sparrow has become quite common in many parts of our state.

Dendroica tigrina.— Though the Cape May Warbler is rare in many places, it is exceedingly common in the interior of West Virginia, in migration, and, at times, becomes very destructive to the grape crop.

Dendroica cærulescens cairnsi.— Several specimens of Cairns' Warbler were taken about the Cranberry Glades showed few of the supposed marks of *cairnsi*. In almost every respect they were typical specimens of *Dendroica cærulescens cærulescens*.

Seiurus noveboracensis noveboracensis.— The Water-Thrushes were very abundant at the headwaters of Williams, Cranberry, Greenbrier and Cheat Rivers in West Virginia. At our camp near Cranberry Glades these birds could be heard almost constantly, and were common in the higher altitudes wherever we went.

Oporornis philadelphia.— A great many Mourning Warblers were seen in the mountains round about the Cranberry Glades and in the more elevated regions at the head-waters of the Greenbrier and Cheat Rivers. Previously Dr. Rives had found this bird in the summer in the great spruce belt near Davis in Tucker County, and I had found them breeding on Spruce Knob in Pendleton County. The presence of this northern warbler in so many places greatly extends its known breeding range in West Virginia. No nests were found, but up to June 9 the birds were still abundant in the regions visited. Three pairs were observed on Shaver's Mountain near Wildell.

Hylocichla ustulata swainsoni.— A nest of the Olive-backed Thrush was found on June 9 on top of Shaver's Mountain. This nest was placed in a small red spruce about two feet from the ground, and contained three fresh eggs. This is the second nest of this species ever found in West Virginia, and, with the nest which I found on Spruce Knob in 1908, marks the southern limit of the breeding range of this species. The eggs, which we needed for scientific purposes, are now in the private collection of Orr R. King. I believe this species may soon be found as far south as the Cranberry Glade region, where so many northern forms occur.— Earle A. Brooks, *Weston, West Virginia.*

Some Winter Bird Notes from the Yellowstone National Park.— From February 21 to March 1, 1914 I was at Gardiner, Montana, having gone there to see what I could of the game animals of the Yellowstone National Park in winter. I spent some of every day during that time in the Park, sometimes the greater portion of the day. My observations extended as far as Mammoth Hot Springs, and from there along the Cook City road for about two miles. On the twenty-eighth I walked to Mammoth by way of the "old road" which takes one up over the hills; the other days I was up and down the road along the Gardiner River. I also spent considerable time about the low hills around the field just inside the

Park near Gardiner. The following list of nine species would hardly be worth publishing were it not for the fact that nothing at all seems to have been published about the winter birds of the Park. I was surprised not to have seen Juncos and Tree Sparrows. On the banks of a ditch around and across the field was a dense growth of "sweet grass" which seemed like excellent cover for such species but no birds of any sort were seen there; possibly because of the lack of any food.

The following birds were seen:—

Anas platyrhynchos. MALLARD.— On February 28 I saw six Mallards about open water below the military post electric light plant near Mammoth, the water being from the stream or ditch which supplies the plant. A young man living at Gardiner told me that several species of ducks wintered in the Park, but this was the only one I saw there, but I did see Golden-eyes in the Yellowstone River between Gardiner and Livingstone, March first. The warm water from the hot springs flowing into the Gardiner River keeps the latter from freezing.

Ceryle alcyon alcyon. BELTED KINGFISHER.— A Kingfisher was seen on the Gardiner River on February 21, 23, and 27. But one bird was seen on each occasion, presumably the same individual.

Otocoris alpestris leucolæma (?). DESERT HORNED LARK.— February 28 half a dozen Horned Larks were seen on the old road about a mile from Gardiner. Possibly this subspecies.

Pica pica hudsonia. MAGPIE.— One seen February 28 near the old road two miles from Gardiner. The only one of the species observed and I saw no nests in any of the trees or bushes anywhere that I went.

Corvus corax sinuatus. RAVEN.— Ravens were seen on five different days, mostly in the cañon along Gardiner River, but once at Fort Yellowstone, Mammoth Hot Springs.

Nucifraga columbiana. CLARKE'S NUTCRACKER.— This species was common at Fort Yellowstone and Mammoth Hot Springs, and was noted once or twice in Gardiner Cañon. It was quite tame at the Fort. I was surprised not to see any Rocky Mountain Jays, *Perisoreus c. capitalis*.

Cinclus mexicanus unicolor. DIPPER, WATER OUSEL.—Water Ousels were more common along the Gardiner River than I have ever seen them anywhere, and I noted them daily, half a dozen or more each day in a distance of less than three miles. This abundance of a species which is apparently numerically limited in individuals is probably explained by the fact that birds from various parts of the Park were wintering here where there was open water. Cold weather has no terrors for them, but they must have open water.

Penthestes atricapillus septentrionalis. LONG-TAILED CHICKADEE. — A few Chickadees of this species were identified in Gardiner Cañon February 23. This species is not given by Dr. Palmer in his 'Notes on the Summer Birds of the Yellowstone National Park.' I saw Chickadees on another occasion but could not get close enough to identify them.

Myadestes townsendi. TOWNSEND'S SOLITAIRE.— One individual seen in Gardiner Cañon February 23 and 26.

When in the Park in the summer of 1904 I saw 3 or 4 Cranes, either the Sandhill (*Grus mexicana*) or the Little Brown (*G. canadensis*), in Gibbon Meadow, on July 26; and Rocky Mountain Pine Grosbeaks (*Pinicola enucleator montana*) were seen at the Thumb July 22, and at Upper Geyser Basin July 23. Neither of these species is mentioned by Dr. Palmer.— EDWARD R. WARREN, *Colorado Springs, Colo.*

Some Breeding Birds of Garrett Co., Md.— During a residence of fourteen years at Jennings, Garrett Co., Maryland I have had abundant opportunities to study the birds of the vicinity. I have recorded practically all of the boreal species listed by Mr. G. Eifrig (Auk, 1904, pp. 234–250) and have made a few observations which being supplementary to his seem worthy of record.

Astur atricapillus. GOSHAWK.— A pair were present all summer and nested about three miles above Jennings in 1901 but were both shot by a native and since the cutting away of the spruce and hemlock forest they have disappeared as breeders.

Nuttallornis borealis. OLIVE-SIDED FLYCATCHER.— Seen regularly in spring migration but I have no positive evidence of their breeding here.

Nannus hiemalis hiemalis. WINTER WREN.— Formerly frequent and still found as a regular breeding bird in this vicinity.

Hylocichla ustulata swainsoni. OLIVE-BACKED THRUSH.— A regular summer resident before the cutting of the spruce timber, but does not now remain to breed in this vicinity.

Regulus satrapa satrapa. GOLDEN-CROWNED KINGLET.— Formerly a regular breeder in localities thickly sprinkled with spruce timber but for the past six years since the last of the spruce was cut the Kinglet does not remain here to nest.— HERMAN BEHR, *Jennings, Maryland.*

Serious Loss of Bird-Life During Spring Migration.— There is undoubtedly a very serious loss of bird life every few years during the spring migration by sudden climatic changes, yet it is only occasionally that any details of unusual mortality are brought to the notice of those interested in the subject.

A severe storm of wind or rain with a sudden sharp drop in temperature will, I have no doubt, kill more small species than we have any realization of.

After a storm in May, Mr. E. W. Nelson once picked up on the shore of Lake Michigan forty-four recognizable specimens, including twenty-six species. This covered a stretch of only two miles.

On May 12, 1888, when the wind blew a gale and the temperature suddenly dropped from 64° to 34°, there was a great mortality in bird life between Chicago and Milwaukee, and probably over a much larger territory. In some localities the ground was strewn with birds, largely warblers. At

Racine, Wis., the late Dr. P. R. Hoy personally examined 645 specimens, including 22 species, of which 437 were warblers. They were picked up in one locality. Imagine the devastation which must have occurred, even between these points, right in the tide of the migration.

Another instance has just come to pass, and while comparatively few specimens were seen that had perished, there is no question but that the mortality was great.

Mr. W. B. Mershon and my brother Charles E. Deane, reached the Gaspé Peninsula, Quebec, on June 6, 1914, for salmon fishing on the Grand Cascapedia River. They learned that from the third to the fifth the region about had experienced a very severe storm of rain and snow, accompanied by a fierce gale of wind. Snow fell to the depth of four inches at Matapedia and other points, with a temperature down to 34°, and reported even lower further east. The snow did not remain long except on the high hills. One guide at Grand Cascapedia reported that he picked up five dead birds near his barn, while numbers flew into the barn and around the doors of his dwelling, seeking protection. Other guides reported dead birds lying around their buildings and along the road, and brought in specimens. Three that were forwarded to me proved to be females of the Redstart, Canadian and Blackburnian Warblers.

That this unusual storm and low temperature was general over the peninsula, is shown by the following letter, received from the director of the Canadian Meteorological Office under date of June 25, 1914.

"With reference to your letter of the 23rd. inst. I would inform you that between the 4th. and 5th. of June, 1914, quite a severe northeasterly storm occurred on the Gaspé coast caused by the development and movement of an area of low pressure from the New England States to the Gulf, taken in conjunction with the approach at the same time of a pronounced cool wave from the Hudson Bay Region. The temperature along the Gaspé coast varied between 36 and 42 degrees. The precipitation was largely rain, but at the same time wet snow fell locally, and in a few localities the fall is reported to have amounted to as much as six inches. On the 3rd. there was also some light local snow in the Gaspé Peninsula, but unaccompanied by wind, the temperature then fell to the freezing point or a little below."

Mr. Mershon states that he has never been in a region where warblers were more abundant in June, his observations covering a series of year dating back to 1886 — Ruthven Deane, *Chicago, Ill.*

RECENT LITERATURE.

Eaton's 'Birds of New York.'[1]—The first volume of Mr. Eaton's 'Birds of New York' was reviewed in these columns in July, 1910, at which time it was expected that the publication of the present, concluding, part would immediately follow. An introductory note however explains that the delay has been due to the regrettable illness of the author. The work as finally completed follows exactly the lines originally laid down and we think that the author, the authorities of the State Museum and the people of New York are to be congratulated upon the production of what is the most comprehensive state ornithology that has yet appeared.

So closely does the main text of the volume before us follow the plan of Part I that the remarks of the former reviewer are equally applicable to it. The accounts and descriptions of species are excellent and the handling of the quoted data admirable. In fact little or no improvement can be suggested in the work of the author, but the peculiar system of capitalization followed in the State Museum publications, and the exceedingly heavy coating of the paper upon which the book is printed are unfortunate. The text covers the 'land birds' from the Birds of Prey to the Passeres inclusive, following the order and nomenclature of the A. O. U. Check-List.

In addition there is an introductory chapter on bird ecology and economic ornithology, which contains much valuable information, though the variety of type used in the headings of the several sections leaves one in doubt as to just how it was intended to divide it. There is also an addendum of two pages covering 'New York Bird History since 1910.'

As this work is the only recent state ornithology which attempts to give original colored figures of all the species, a great deal of interest centers on the plates. As in the preceding part these are from the brush of Mr. Louis Agassiz Fuertes and taken all in all constitute a wonderful series of bird portraits. It is always to be regretted that questions of space and expense make it impossible for the artist in a work like this to enjoy the freedom that is allotted to the author. Figures must be crowded on plates, and where an occasional life size portrait is permitted, the birds are so out of proportion to those on other plates, or to the size of the page, that we cannot properly appreciate them. These points however are not the fault of the artist, nor are the color tones used in the printing, which while generally good, are noticeably bad in the case of the Song Sparrow which appears red enough to entitle it to classification under the desert race of the Southwest.

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[1] **Birds of New York. By Elon Howard Eaton. = Memoir 12, New York State Museum. John M. Clarke, Director. Part II. General Chapters; Land Birds. 4to, pp. 1–719 (facing leaves to plates counted as pages 545–672), 64 colored plates and numerous half-tone text illustrations. Albany. University of the State of New York, 1914.**

The question of background may be a matter of taste, but we think that when reduced to a minimum, as in the plate of the small flycatchers, the result is infinitely better than that attained with the abundance of green leaves seen in the warbler plates, or even the landscapes that are introduced with some species.

In both illustration and taxidermy there may be said to be two possible objects in view, a bird portrait or a picture, and the addition of accessories necessary to improve the picturesque effect is bound to detract from the portrait of the individual bird. A group showing a phase of the life history may well be a picture but for a work of this kind we prefer the portrait. As already said, however, perfection in the arrangement of plates and size of figures is too much to hope for in any work of even quarto size and the handling of the matter in the 'Birds of New York' has been all that could be asked, while the work will stand as a monument to both author and artist.—W. S.

Swarth's List of Arizona Birds.[1]— While Arizona has been for many years past a favorite resort for the ornithologist, no one it seems has ventured to compile a complete list of its birds until Mr. Swarth began the work some eleven years ago. The varied topography of the state, our inadequate knowledge of the ranges of many forms and the constantly shifting nomenclature have tended to make the task anything but an easy one, and it is fortunate for ornithology that it was left for one who possessed the perseverance and painstaking accuracy that Mr. Swarth has displayed.

In general style the list follows Grinnell's 'Check-List of California Birds' but is more detailed in the statement of ranges and fuller in the citation of authorities for records quoted. The main list contains 362 species, with a hypothetical list of 24. There are 152 residents, 72 summer visitants, 57 winter visitants, 30 transients and 51 of casual occurrence.

A brief discussion of the several life zones and their characteristic birds with an original faunal map follows the list, and a bibliography of 313 titles and an index complete the work. The first entry in the bibliography is Gambel's paper of 1843, and Woodhouse's account of Sitgreaves' expedition, 1853, is the only other contribution prior to the Pacific railroad reports, while up to 1880 there had appeared only 43 papers bearing upon Arizona birds, so that the literature is for the most part comparatively recent.

Mr. Swarth follows the order and, in the main, the nomenclature of the A. O. U. Check-List departing only in the recognition of certain forms not accepted by the latter; in the rejection of the Western Sparrow Hawk as a distinct race from the eastern bird; and in differences in the rank of several

[1] A Distributional List of the Birds of Arizona. Cooper Ornithological Club. Pacific Coast Avifauna No. 10. Contribution from the Museum of Vertebrate Zoölogy of the University of California. Hollywood, California. Published by the Club. May 25, 1914, 8vo, pp. 1–133, with colored zonal map.

forms, in which cases he prefers to follow the works of Mr. Ridgway and other specialists.

Swarth's list is a very acceptable piece of work and one of which he may well feel proud, while students of the ornithology of the southwestern portion of our country will find it a reliable guide to the ornis of one of the most interesting states, zoölogically speaking, of the entire Union.— W .S.

Aiken and Warren on the Birds of El Paso County, Colorado.[1]— This is an admirably prepared annotated list of 276 species, with an introductory discussion of topography, life zones, analysis of the bird fauna, workers in the region and a bibliography. The forty-five half-tones are from photographs from nature, all but two by Mr. Warren, and furnish good illustrations of many birds as well as nests and eggs.

We learn from the introduction that Dr. J. A. Allen was the first ornithologist to visit El Paso County, his report published in 1872 being the first list of Colorado birds. Mr. Aiken the senior author of the list came to Colorado Springs in 1871 and his collection begun soon after his arrival, is now in Colorado College. Mr. Warren's residence dates from 1881.

With ample material and long experience in the region of which they treat, the authors were well fitted to turn out an authoritative work and have succeeded admirably.

Why a paper of this sort should be published in two parts both of which were printed and distributed apparently at the same time, and why both parts are numbered, " 13 " in one series and " 74 " and " 75–76 " in another, are problems that only those in charge of the Colorado College publications can explain, while to others they will prove a source of annoyance and complication.— W. S.

Mathews' Birds of Australia.[2] — With part 6 the third volume of this great work is brought to a close completing the Herons and Bitterns. The high standard of the previous volumes is fully maintained and so thoroughly has the author covered the subject of nomenclature that we find but one new name dating from this part, i. e. *Hemigarzetta* (p. 448) a new generic term for *Herodias eulophotes* Swinhoe.— W. S.

Bannerman on the Ornithology of the Canary Islands.[3]— In this admirable paper Mr. David A. Bannerman gives us a most interesting account of his visit to this island group and a careful discussion of the birds

[1] The Birds of El Paso County, Colorado. By Charles E. H. Aiken and Edward R. Warren. Colorado College Publication Science Series. Vol. XII, No. 13. Part I (pp. 455–496) published May, 1914. Part II (pp. 497–603) June–September 1914. Price respectively 40 cts. and 75 cts.

[2] The Birds of Australia. By Gregory M. Mathews. Vol. III, Pt. 6. June 25, 1914.

[3] An Ornithological Expedition to the Eastern Canary Islands. Parts I. and II. The Ibis. January and April, 1914.

he found there. The number of 'island races' described from the Canaries is considerable and our author is thoroughly up to date in his recognition of them and in his use of trinomials in their designation.— W. S.

The New Nature Library.[1]— It seems but a few years ago that the only popular works on general natural history were those of Rev. J. G. Wood and a few others who wrote from a British standpoint and who had but little to say of American species. The publication of a Nature Library, exclusively American, was therefore an exceedingly happy idea. The volumes constituting the original library are familiar to a large number of nature lovers, and ornithologists who, to be good ornithologists, should know something of the other classes of animals as well as of plants, have found them a valuable series of reference volumes. The new thin paper edition reduces the bulk of the set about one half and makes them handier for consultation. It is to be regretted that in getting out a new edition the groups overlooked in the previous one could not have been included — the salamanders for instance among the vertebrates, and the beetles among the insects, as well as the whole series of lower marine invertebrates. Had the molluscs been restricted to North American species as was done in all other groups these might easily have been added without much increase in bulk. However the volumes will guide many a student and answer many a question for the amateur for years to come.— W. S.

Recent Publications on Economic Ornithology.— Two recent bulletins of the U. S. Department of Agriculture deal with birds. 'Five Important Wild-Duck Foods' by W. L. McAtee[2] is published in response to a demand for a similar publication which appeared some time ago. In these days of bird refuges and sanctuaries it is important to know what to plant in order to furnish food for birds of all kinds. In this paper the 'Delta Duck Potato' and 'Wapato' both species of *Sagittaria*, the 'Chufa,' *Cyperus esculentus*, 'Wild Millet' *Echinochloa crus-galli* and the 'Banana Water Lily' *Nymphaea mexicana* are discussed. 'Birds in Relation to the Alfalfa Weevil' By E. R. Kalmbach[3] will be of value to all growers of forage plants. While at present restricted to northern Utah the pest is spreading and it is well to remember the part birds play in its destruction and also to know that young chickens and turkeys are an excellent check to the weevils if allowed to feed in infested fields.

Mr. H. P. Attwater[4] has compiled an excellent Bulletin for the Texas Department of Agriculture entitled 'Use and Value of Wild Birds to Texas

[1] The New Nature Library. Vols. I–VIII. Doubleday Page and Co. New York. Cloth. $31.50.

[2] Five Important Wild-Duck Foods. By W. L. McAtee. Bulletin 58, U. S. Dept. Agr., pp. 1–19. Feb. 7, 1914. Price, cts.

[3] Birds in Relation to the Alfalfa Weevil. By E. R. Kalmbach. 107, Bull. U. S. Dept. Agr., July 27, 1914, pp. 1–64.

[4] Use and Value of Wild Birds to Texas Farmers and Stockmen and Fruit and Truck Growers. Compiled by H. P. Attwater. 1914. Bull. No. 37, Texas Dept. of Agr., pp. 1–61. Distributed by the Commission of Agriculture, Austin, Tex.

Farmers and Stockmen and Fruit and Truck Growers.' The text consists largely of well selected extracts from standard publications and addresses by the compiler and others. The bulletin will do a great good, reaching as it will many people in this vast state who do not see the economic publications of the National Government.

In this connection mention should also be made of Mr. Shiras' able publication on the 'Necessity for, and Constitutionality of the Migratory Bird Law.'[1] The whole subject is thoroughly discussed and attacks upon the law ably answered. Mr. Shiras was the author of the original bills that were presented to Congress and is therefore particularly well qualified to discuss the subject.— W. S.

Further Observations by Collinge on the Dispersal of Weed Seeds by Birds.— Prof. W. E. Collinge has continued his studies of the viability of weed seeds after passing through the alimentary canals of birds. The general results given in the present brief report[2] agree with those previously announced, namely, that a surprisingly large number of seeds do pass through the alimentary tracts of seed-eating birds in condition to germinate.

The special point made in the present paper, and a novel one it is, is succinctly stated in the following quotation: "it would appear that, in dry years, such birds as the rook, starling, house sparrow (and probably many other species) take in a much smaller quantity of grit and soil than in wet years, in consequence of which a larger percentage of weed seeds pass through the intestinal canal in an uninjured condition."— W. L. M.

Herman on Useful and Harmful Birds.— It is a proof of the great demand in European countries for a book on economic ornithology, as well as a tribute to Dr. Otto Herman, that his work (originally in Hungarian) has been translated into both German[3] and English.[4] The artist M. Titus Csörgey shares the honors as his spirited drawings illustrate all of the editions. Both of the translations contain additional figures and the text has in greater or less degree been adapted to local conditions. The English edition especially has thus been augmented, and properly is published as a collaborated work: authors, Otto Herman and J. A. Owen. While these books are fairly satisfactory manuals of European economic ornithology, they lack the definiteness and scientific detail that characterize American publications of a similar nature. This is merely a matter of style, however, as the basis of all of these books is the investigations of the Royal Hungarian Central Bureau of Ornithology which have included the examination of thousands of bird stomachs.— W. L. M.

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[1] Necessity for and Constitutionality of the Act of Congress Protecting Migratory Birds. By George Shiras, 3d, pp. 1–99.

[2] Journ. Economic Biol. IX, No. 2, June, 1914, pp. 69–71.

[3] Nutzen and Schaden der Vögel. Gera. 1903, 333 pp. 95 pls.

[4] Birds useful and birds harmful. Manchester, 1909, 387 pp., 98 pls.

Food of the Common Partridge (*Perdix perdix*) **of Europe.**[1]— Considerable interest attaches to this article as large numbers of these birds under the name of Hungarian Partridges are being imported and naturalized in this country. The authors give the result of painstaking examinations of 295 (!) stomachs and crops from birds secured in Hungary. For the month of August the results given are very complete but they cannot be considered conclusive for the entire year. The different months are represented as follows: January, 9 birds; February, 7; March, 4; April, 2; June, 2; July, 4; and August, 257. The large number secured in August were taken in the hunting season, while the months from September on are entirely unrepresented. Field observations supplement the detailed stomach examinations.

The great bulk of the food as shown by tabulation is made up of vegetable matter of which weed seeds and fragments of plants predominate. Wheat was found in 147 instances in amounts varying from 1 to 122 grains. Barley was taken 87 times, oats 47 times and rye 29 times, while smaller amounts of corn, buckwheat, vetch, timothy, red clover and sorghum seeds were identified from the stomachs. It is stated, however, that all these grains are picked up as waste in the stubble so that they do not count against the partridges. A few birds taken from January to June had eaten large amounts of grass.

Among seeds of plants that may be called weeds and others of neutral value 107 species were identified as of more or less common occurrence. knotweeds (*Polygonum aviculare, convolvulus* and *lapathifolium*) were taken frequently and the common pigeon grass (*Chaetochloa glauca*) was eaten 164 times, as many as 820 seeds being encountered in a single individual. Bottle grass (*Chaetochloa viridis*) seeds too were eaten extensively. A star thistle (*Centaurea cyanea*) was eaten 101 times and the long array of other species occurred in smaller amounts. These are said to be mainly seeds of plants which grow among crops and along the borders of the fields so that in eating them the partridges may do a small amount of good.

Insect remains were found in 177 instances though in only eleven cases did they form any large amount of the contents. One third of the 38 species of beetles eaten were ground beetles (*Carabidæ*) but some of these are not predaceous species and seven of those listed are said to be actually injurious. Two Coccinellids and one Cicindelid form the remaining beneficial species. Several *Scarabæids* were secured, one of which (*Phyllopertha horticola*) damages oaks while click and leaf-beetles and various weevils may be noted. Ants form the bulk of the animal food listed and among them *Lasius alienus* was eaten 72 times and *Lasius niger* 57 times. Of the latter as many as 250 examples were taken from one bird. Cater-

[1] Über den wirtschaftlichen Nutzen des Rebhuhns-Perdix perdix (L.) — Aquila 1912, pp. 166–209.

Vegetabilische Nahrung des Rebhuhns, von Ludwig Thaisz. Die Insectennahrung des Rebhuhns (Perdix perdix L.) von E. Csiki.

pillars of 3 species were identified, flies were taken once and locusts (mainly *Stenobothrus* sp.) occurred 16 times. The Hemiptera secured were largely injurious forms and last of all remains of spiders were encountered 4 times. In conclusion it is stated that the Partridge may be considered beneficial to agriculture in its food habits as well as of value as a game bird.

Had the results of the examination of the vegetable food been tabulated in some way the information presented would be more readily available but otherwise the paper may be commended as a careful piece of work. It is to be hoped that further investigations may give information of the food for the last part of the year and supplement the examinations made in the spring months. The young in the first few weeks of their existence should consume large amounts of insects.— A. W.

The Ornithological Journals.

Bird-Lore. Vol. XVI. No. 4. July–August, 1914.

At Home with a Hell Diver. Some Observations on the Nesting of the Pied-billed Grebe. By A. A. Allen.— A most important study of the nest-life of this species, illustrated.

The Morning Bird Chorus in Pasadena [Cal.] By Garrett Newkirk.

Destruction of the Rhea, Black-Necked Swan, Herons and Other Wild Life in South America. By Leo E. Miller.— Observations made on the Roosevelt South American Expedition.

Comparative Abundance of Birds. Letters from A. H. Thayer and Hugo Münsterberg.— Statements based on memory are practically worthless.

Migration of N. A. Sparrows. By W. W. Cooke.— Plumage Notes by F. M. Chapman and color plate of Sharpe's Seedeater and Lark Bunting by Fuertes.

A Coöperative Study of Bird Migration. Compiled by C. H. Rogers.

Educational Leaflet.— The Sora Rail. By E. H. Forbush with color plate by Horsfall.

The Condor. Vol. XVI. No. 4. July–August, 1914.

A plea for Comparative Oölogy. By T. W. Richards.— Good advice on the broadening of this line of research.

On the Oölogy of the North American Pygopodes. By R. W. Shufeldt.— With five plates.

The Wilson Bulletin. Vol. XXVI. No. 2. June, 1914.

Ten Days' Bird Study in a Nebraska Swamp. By I. N. Gabrielson.— Annotated list of 46 species seen at Crystal Lake with detailed study of nest life of the Yellow-headed and Red-winged Blackbird and American and Least Bittern. In considering the identification of insects fed to the nestlings, the reader should consult the criticism of similar papers on p. 420–421 of 'The Auk.'

Breeding Birds of a Clay County, Iowa, Farm. By I. N. Gabrielson.— Annotated list of 50 species.

Notes on the Spotted Sandpiper. By A. F. Smith.— Interesting study of nest-life.

The Resident Bird Life of the Big Cypress Swamp Region [Lee Co., Fla.]. By F. M. Phelps.— Annotated list of 65 species.

The Oölogist. Vol. XXXI. No. 6. June 15, 1914.

A 'warbler number' with accounts of the breeding of numerous species. Also lists of the warblers of Doddridge Co., W. Va., and Warren Co., Pa. By R. B. Simpson, and Summer Residents of the Pensauken Creek, N. J., By R. F. Miller.

The Oölogist. Vol. 'XXXII' (= XXXI). No. 7. July 15, 1914.

The Dusky Seaside Sparrow. By O. E. Baynard.— Contains account of the discovery of the nest and eggs of this species.

[List of Birds observed in Milton Co., Ga.] By D. V. Hembree.— 89 species.

The Oölogist. Vol. 'XXXII' (= XXXI). No. 8. August 15, 1914.

Glimpses of Bird Life in Utah. By Mrs. A. Treganza.

Notes from Bear River Marshes, Utah. By E. Treganza.

The Ibis. X Series. Vol. II. No. 3. July, 1914.

Observations on the Bird-Life of the Anatolian Plateau during the Summer of 1907. By L. N. G. Ramsay.— Description of this section of Asia Minor with an annotated list of 60 species.

Notes from Mesopotamia. By R. Meinertzhagen.

A Note on the Common Ringed Plover of the British Isles and on Coloration as a Factor in Generic Differentiation. By P. R. Lowe.— A large pale race *Charadrius hiaticula major* Seebohm is separated from true *hiaticula* and as Greenland examples are referred to it, it will replace *C. hiaticula* in the A. O. U. Check-List. The consideration of color in generic taxonomy is strongly urged, a contention which we heartily endorse.

Notes on Molina's Pelican (*Pelecanus thagus*). By H. O. Forbes.— With two color plates.

On a Peculiarity in the Nest of the Tasmanian Tit (*Acanthiza diemenensis*). By H. S. Dove.— Apparent intelligence in weaving nest materials.

The Surface Breeding Petrels of the Kermadec Group. By T. Iredale.

On *Sterna fuscata* Linn. By T. Iredale.— Endorses the use of this name as accepted by the A. O. U. Committee.

The Distribution and Nidification of the Tubinares in the North Atlantic Islands. By D. A. Bannerman.— 14 species are considered of which 9 are regular breeders on one or more of the island groups under consideration — i. e. the Azores, Madeira, Salvages, Canary and Cape Verde Archipelagos. Each species is discussed in detail with abundant quotations and references to the literature.

Some Facts bearing on the Affinities of Smithornis. By G. L. Bates.— A presentation of important discoveries in the anatomy of *Smithornis* which show it to be non-passerine in its affinities.

Notes on some Species of the Genus *Thalassogeron*. By T. Salvadori.— *T. carteri* and *T. eximius*.

Bulletin of the British Ornithologists' Club. No. CXCVIII. May 28, 1914.

Capt. H. Lynes described a recent trip to the Sudan in company with Messrs. Abel Chapman and W. P. Lowe, *Mirafra sobatensis* (p. 129) mouth of Sobat River, and *Calamocichla leptorhyncha merensis* (p. 130). Upper White Nile, are described as new.

Capt. Lynes also described (p. 131) *Ortygospiza gabonensis* a new Weaver-Finch from Gaboon.

Mr. C. Chubb described *Planesticus arthuri* (p. 131), Abary River, British Guiana, and *Euscarthmus josephinae* (p. 131), Supenaam, Essequebo River, British Guiana.

Erythropygia ansorgii Ogilvie-Grant (p. 134) North Angola, and *Camaroptera superciliaris ugandæ* Stephenson Clarke (p. 136), Uganda, were also described as new.

Bulletin of the British Ornithologists' Club. CXCIX. June 29, 1914.

Hon. W. Rothschild discussed the three Algerian races of *Garrulus glandarius*.

Mr. Claude Grant described (p. 141) a New Guinea-fowl from the Lake Baringo district, British East Africa, as *Numida ptilorhyncha baringoensis*.

British Birds. Vol. VIII. No. 1. June 1, 1914.

The Study of Bird-Notes. By Dr. Hans Stadler and Cornel Schmitt.

Notes on the Red-necked Phalarope in the Outer Hebrides. By Mary G. S. Best and Maud D. Haviland.— Photographs of *Phalaropus hyperboreus*.

British Birds. Vol. VIII. No. 2. July 1, 1914.

Ecological Relations of Bird Distribution. By S. E. Brock.— An admirable discussion of this subject interesting alike to the student of zoögeography and of bird protection. A statement that the latter should consider carefully is: "Persecution has locally exterminated individual species; environmental alteration has locally caused the disappearance of whole groups of species. The felling of a forest or the draining of a marsh is more effective than much slaughter."

British Birds. Vol. VIII. No. 3. August 1, 1914.

Notes on Breeding Habits of Avocets. By Mary G. S. Best.— Admirable photographs.

Ringing Birds in Hungary. By H. F. Witherby.— Interesting description of a new method of snaring old birds at the nest, which rarely causes them to desert and is likely to yield valuable results by showing where birds banded as nestlings, go to breed.

The Avicultural Magazine. Vol. V. No. 8. June 1914.

Crowned Cranes and Stanley Cranes. By Maurice Portal.— Excellent photographs of both species.

Birds of N. S. Wales I have caught and kept. By G. A. Heumann.

The Avicultural Magazine. Vol. V. No. 9. July, 1914.

The Yellow Wagtail. By J. H. Symonds.— Photographs of bird and nest.

The Cinnamon Teal. By Major Boyd Horsbrugh.— Incidental notes on Californian Waterbirds.

English Names for the Parrots. By Dr. E. Hopkinson.— A Synonymy that will prove of value to inspectors of imported birds.

The Avicultural Magazine. Vol. V. No. 10. August, 1914.

Flamingos. By Hubert D. Astley.— Republication of Sir Harry Johnston's plates and account of *Phæniconais minor* in B. E. Africa.

The South Australian Ornithologist. Vol. I. Part 3. July,1914.

A Sketch of the Life of Samuel White. By his son S. A. White.

Field Notes on *Virago castanea* and *Virago gibberifrons*. By S. A. White.

Birds in a North Adelaide Garden. By A. M. Morgan.

The Emu. Vol. XIV. Part 1. July, 1914.

Two New Genera of Parrots for Australia. By G. M. Mathews.— *Geoffragus geoffroyi macclennani* and *Eclectus pectoralis macgillivrayi*, both here figured.

The Myology of the Bell-Magpie (Strepera) and its Position in Classification. By J. A. Leach.— An exhaustive anatomical study resulting in the decision that Strepera is not at all allied to the Crows but should form a separate family along with *Gymnorhina* and *Cracticus* which have usually been regarded as aberrant Shrikes.

North Territory Birds. By H. G. Barnard.— An annotated list of 170 species with a list of stomach contents of all birds collected and a table of measurements of nests examined. The vexed question of nomenclature is met by citing both the R. A. O. U. names and those of Mathews' 'List.'

Three New Subspecies of Birds. By G. M. Mathews (p. 60) *Eopsaltria australis austina* Cobbora, N. S. W.; *Acanthiza nana dorotheæ*, Lithgow, N. S. W.; *Geobasileus reguloides tarana*, Tarana, N. S. W.

The Journal of the South African Ornithologists' Union. IX. No. 2. December, 1913.

Notes on *Euplectes xanthomelas*. By L. B. Mouritz.

On a pair of Tame Ground-Hornbills (*Bucorax cafer*). By C. F. M. Swynnerton.

Some Rambling Notes on Birds, with the Description of a New Species. By Austin Roberts.— *Cisticola mystica* sp. nov. (p. 106) Pretoria.

The Secretary Bird (*Serpentarius serpentarius*). By Alwin Haagner.

Bird Notes. Vol. V. No. 5. May, 1914.

My Weavers and Whydaks. By Sidney Williams.— Photograph of nests constructed in the aviary.

Bird Notes. Vol. V. No. 6. June, 1914.

An April Morning in Northern India. By D. Dewar.

Birds of the Jhelum District (Punjab). By H. Whistler. Runs through May–July.

Revue Francaise d'Ornithologie. Vol. VI. No. 62. June 7, 1914. (In French).

List of Birds Obtained or Observed at Dahomey 1908–1912. By G. Bouet (concluded).

Note on *Houbara undulata* and Some Points Relative to the Ornithology of Tunis. By L. Lavauden.

Revue Francaise d'Ornithologie. Vol. VI. No. 63. July 7, 1914.

The Illumination of Ostrich Eggs. By A. Menegaux.— The practice, known to dealers in hen's eggs as 'candling'.

Notes on the Birds Observed and Secured in Algeria. By M. Spatz. 1912–1913. By Count Zedlitz (concluded).

Ornithologische Monatsschrift. Vol. XXXIX. No. 5. May, 1914. (In German).

Imitative Ability in our Native Birds. By W. Koch.

Journal für Ornithologie. Vol. 62. Part 3. July, 1914. (In German.)

Birds of the Middle Kergisensteppe. By P. P. Suschkin.

Contribution to the Ornithology of Prussian Schlesia. By C. Kayser.

Annual Report (1913) of the Rossitten Bird Observation Station. By By Dr. J. Thienemann.

In the Proceedings of the German Ornithological Society Prof. Reichenow (p. 488) proposes two new genera, *Gymnomyza*, type *Leptornis aubryanus* and *Dreptes*, type *Nectarina thomensis*.

Ornithologische Monatsberichte. Vol. 22. No. 6. June, 1914. (In German.)

On the Biology of *Cisticola schusteri* Rchw. By Ludwig Schuster.

The Geographic Forms and Plumages of *Ploceus fusco-castaneus* Boc. By Oscar Neumann.

Ornithologische Monatsberichte. Vol. 22. No. 7–8. July–August, 1914.

Remarks on Some Birds of the East Sea Provinces. By N. Sarudny and M. Härms — *Acanthis hornemanni exilipes* Coues among others.

Observations on Hybrid Canaries. By F. Braun.

Sparrow Hawks, Bird Intelligence and Alarm Notes. By R. Biedermann Imhoof — Some astonishing syllabic representations of bird calls!

On the Phänologie of the Song of *Alauda arvensis*. By K. Radig.

On a Supposed New Species of *Dicæum* from Java. By Max Bartels.— *D. finschi* (p. 125) Goenoeng Beser, W. Java.

Ornithologische Monatschrift. Vol. 39. No. 6. June, 1914. (In German.)

Bird Protection and the Feather Fashion.

Ornithologisches Jahrbuch. Vol. XXV. Parts 1–2. January–April, 1914. (In German.)

Contribution to our Knowledge of the Ornithology of Croatia. By Dr. M. Hirtz.

Birds of the Island of Arbe [N. Dalmatia]. By Dr. G. Schiebel.

Remarks on *Emberiza citrinella*. By Dr. J. Gengler.— Four races recognized.

The Flapping of Birds of Prey with and against the Wind. By R. Biedermann-Imhoof.

Passer hispaniolensis canariensis (p. 54) subsp. nov. Fuerteventura, Canary Isls. By Viktor Ritter von Tschusi zu Schmidhoffen.

Proceedings of the Ornithological Society of Bavaria. Vol. XII. Part 1. May 15, 1914. (In German.)

What is *Collocalia fuciphaga* (Thunb.)? By E. Stresemann.— *C. f. micans* (p. 6), Savu; *C. f. moluccarum* (p. 7), Banda; *C. f. hirundinacea* (p. 7), Snow Mts., New Guinea; and *C. lowi palawanensis* (p. 10), Palawan, are described as new.

Materials for a Bavarian Ornithology VIII. Birds of Prey, Owls, Crows and Woodpeckers. By Dr. J. Gengler.

On the Black and White Wheatears. By Dr. J. Gengler.

On a Hybrid from the Pheasant and Blackcock. By L. von Besserer.— With photograph.

Migration in the Environs of Freiburg and the South Vosges Mts. By R. Schelcher.

New Birds from Tropical America. By C. E. Hellmayr and Josef Graf von Seilern.

Hemispingus hanieli (p. 87) Galipan, Venezuela; *Cyanerpes cyanea tobagensis* (p. 88), Tobago; *Myiarchus tyrannulus tobagensis* (p. 89), Tobago; *Lathria cryptolopha mindoensis* (p. 89), Mindo, Ecuador; *Percnostola lophotes* (p. 90), San Gaban, Peru; and *Grallaria ruficapilla avilæ* (p. 92), Galipan, Venezuela.

Aquila. Vol. XX. 1913. (In Hungarian, German and English.)

Numerous articles on Migration of Birds etc. in Hungary.

Histological Investigation of the Mandibular Gland of Birds. By Dr. E. Greschik.

Extinct Ostrich Birds of the United States. By Dr. R. W. Shufeldt.

Additions to the Fossil Bird Fauna of Hungary. By Dr. K. Lambrecht.

Messager Ornithologique. Vol. V, No. 2. 1914. (In Russian).

On the Cuckoos of Turkestan. By N. A. Sarudny.— *Cuculus canorus subtelephonus* (p. 108) subsp. nov.

Ornithological Observations in northwestern Transcaucasia. By N. S. Dorowatowsky.

Notes on Some Caucasian Birds. By E. W. Scharleman.

Ardea. Vol. III. Part 2. June, 1914. (In Dutch.)

Report on the Ornithological Observations of Correspondents of the 'Central Committee for the Promotion of Bird-study and Bird Protection' in 1913. By Dr. L. F. de Beaufort.

What Sort of Birds can one see on a Sea Voyage to the East Indies. By W. C. Van Heurn.

Revista Italiana di Ornitologia. Vol. III. No. 1–2. January–June, 1914. (In Italian.)

Notes on the Great Auk. By E. Arrigoni degli Oddi.

First Capture of *Ardea melanocephala* in Italy. By G. Vallon.

Hapalopteron familiare. By T. Salvadori.— The writer apparently overlooked the note in 'The Auk,' 1912, p. 250.

Agricultural Ornithology. By A. Ghigi.

The Species of the Genus Pipile. By T. Salvadori.— A key with synonymy and remarks for the six recognized species.

Journals of Bird Protection. Besides 'Bird-Lore' the organ of the Audubon Societies and 'Ornithologische Monatsschrift' the well-known German periodical, we have a constantly increasing number of journals devoted to the protection of birds and the advancement of popular bird study. 'Bird Notes and News' the organ of the Royal Society for the Protection of Birds in England is now in its sixth year, the current numbers being devoted mainly to the plumage bill now before Parliament, and to the attempts to provide resting places for migrant birds on the lighthouses.

'Blue-bird' published by Mr. Eugene Swope at Cincinnati, Ohio, in the interest of the Junior Audubon classes and nature study work contains pleasing chats about various phases of nature with excellent photographic studies of birds, wild flowers and scenery. With the August issue Mr. Oscar Baynard of Clearwater, Florida becomes associate editor.

'The Oriole' published by the Somerset Hills Bird Club and edited by Mr. John Dryden Kuser, Bernardsville, N. J. is a credit both to the editor and printer. The June number contains a pleasing account of experiences with British Birds, and of the breeding of the American Merganser in a hollow tree, while the August issue describes the Orioles of Costa Rica and the nesting of the Blue-winged Warbler, also articles on bird study and protection.

'The Oregon Sportsman' edited by warden Wm. L. Finlay for the State Fish and Game Commission, contains the record of an active conservator of wild life in enforcing the laws against illegal hunting.' Incidentally the 'cat question' is considered and the breeding of imported pheasants.

Ornithological Articles in Other Journals.[1]

Young, C. J. The Cardinal Grosbeak in Winter in Northumberland County, Ontario. (Ottawa Naturalist, June–July, 1914.)

Cash, C. G. History of the Loch an Eilein Ospreys. (The Scottish Naturalist, July, 1914.) — Data from 1804 to 1902.

Duchess of Bedford. Spring Bird-notes from Various Scottish Islands. (do., August, 1914).

Selous, E. Ornithological Observations in Iceland, continued. (The Zoölogist, June, 1914.)

Gurney, Robert. The Egyptian Desert and its Birds. (do., July, 1914.)

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[1] Some of these journals are received in exchange, others are examined in the library of the Academy of Natural Sciences of Philadelphia. The Editor is under obligations to Mr. J. A. G. Rehn for a list of ornithological articles contained in the accessions to the library from week to week.

Baynes, E. H. What one Village is doing for the Birds. (Amer. Mus. Journal, April, 1914.)— Work at Meriden, N. H.

Harrison, Launcelot. The Mallophaga as a Possible Clue to Bird Phylogeny. (The Australian Zoologist, June, 1914.) — A suggestive article in which Kellogg's theory that resemblances in the parasitic Mallophaga of various birds may indicate ancestral relationships between the groups, is endorsed. Differentiation it is claimed has been far more rapid in the birds than in their parasites.

Grinnell, J. A New Red-winged Blackbird from the Great Basin. (Proc. Biol. Soc. Wash. May 11, 1914.) — *Agelaius phœniceus nevadensis* (p. 107, Vol. XXVII.), Quinn River Crossing, Humboldt Co., Nevada.

Rothschild, L. Walter. Bird Life on Oceanic Islands and Insular Variations. President's address (Trans. Hertfordshire Nat. Hist. Soc. XV. pt. 1.

Ticehurst, N. F. On the Recent Incursion of Waxwings. (Hastings and E. Sussex Naturalist II, No. 3.) — Reached the Baltic, Oct. 13, Belgium and France middle of Nov., Switzerland end of Nov., Scotland Nov. 10 and remained in England until April 3.

Noch, James J. List of Birds found at and around Hakgala Gardens [Ceylon] (Spoilia Zeylanica IX.)— List of 55 species.

Anon. Hungarian Ringed Storks in S. Africa. (S. Afr. Agr. Journal VII.) — Thirty-two Storks ringed in Hungary and recovered in S. Africa!

Butler, A. L. The Eggs of the Sudan Crowned Crane, *Balearica pavonina ceciliæ*. (The Cairo Sci. Journal, VIII, No. 90.)

Chubb, E. C. A Description of the Millar Collection of S. African Birds' Eggs. (Ann. Durban Mus. I, pt. 1.)— 2500 eggs representing 308 species, showing the lack of necessity in a really scientific collection for large series.

Simon, M. E. Note on some Tochelidæ from Matto-Grosso, Brazil. (Bull. Nat. Hist. Nat. Paris, 1912, No. 8.) — 8 species. (In French.)

Magnan, M. A. Several articles on flight muscles and relation of wing expanse to weight of bird, etc. (In French). (do. Nos. 1, 2, 8.)

Menegaux, A. A new form of *Ammodramus* from Colombia and Ecuador. (In French.) (do. No. 3.) — Refers to *A. savanarum caucæ* Chapm.

Haagner, Alwin. A Descriptive List of South African Birds, Part I. *Struthionidæ — Scolopacidæ* (Bull. Ser. No. 3. S. Afr. Ornith. Union).— A valuable compilation, with ranges and full descriptions.

Dubois, A. Several articles on Belgian birds. (In French.) (Bull. Soc. Zool. France, XXXVIII.)

Menegaux, A. and Dedier, R. A Study of a Collection of Birds made at Yunnan by M. and Mme. P. Comby. (In French.) (Bull. Mus. Nat. Hist. Nat., 1913, No. 6.) — List of 52 species.

A Study of a Collection of Birds from Dahomey (do.).— List of 66 species.

Madarasz, Julius von. Ornithological Results of the Expedition of Rudolf Kmunke in Uganda. (In German.) ("Quer durch Uganda" Berlin, 1913, pp. 183–186.) — 109 species listed.

Pütter, A. The Actions of Birds in Flight. (In German). (Die Naturwissenchaften I and II, 1914.) — An extended discussion of the subject.

Suomalainen, E. W. Ornithological Observations during an Expedition to Western Lapland. (In German.) (Acta Soc. pro Fauna et Flora Fennica, XXXVII, No. 1.) — Annotated list of 102 species with map.

Palmgren, Rolf. Bird fauna of Helsingfors. (In Swedish). (do. XXXVIII, No. 2.)

Finnila, Carl. Ornithological Observations on a Trip through Lappland. (In Swedish.) (do. No. 3.) — List of 97 species.

Shufeldt, R. W. The Extermination of America's Bird Fauna. (Nyt Mag. for Naturvid. LII, No. 1.)

Dabbene, R. and Lillo, M. Description of Two New Species of Birds from the Republic of Argentina. (In Spanish.) (An. Mus. Nac. Hist. Nat. Buenos Aires, XXIV, 1913.) — *Cyanolyseus andinus* (p. 188) Tucuman, *Calopezus intermedius* (p. 192), Tucuman.

Stone, W. Types of Bird Genera, Limnothlypis, New Genus (Science, No. 1018, July 3, 1914) — Proposed for *Sylvia swainsonii* Aud., in place of *Helinaia* which is a synomym of *Helmitheros*.

Publications Received.— **Aiken,** Charles E. H. and Warren, Edward R. The Birds of El Paso County, Colorado. I and II. 8vo. (Colorado College Publ., Sci. Series XII, No. 13, pp. 455–603, index.)

Attwater, H. P. Use and Value of Wild Birds to Texas Farmers and Stockmen and Fruit and Truck Growers. Bull. 37. Texas Dept. of Agr. 1914.

California Academy of Sciences. Report of the President for the year 1913. (Proc. Cal. Acad. Sci., IV, pp. 1–13, Apr. 9, 1914.)

Carnegie Institute. The Eighteenth Celebration of Founder's Day. Pittsburgh, 1914.

Carnegie Museum. Seventeenth Annual Report of the Director. Pittsburgh, 1914.

Cole, Leon J. Studies on Inheritance in Pigeons. Hereditary Relations of the Principal Colors. (Bull. 158, Agr. Exper. Sta. Rhode Island State College, May, 1914, pp. 311–380.)

Eaton, Elon Howard. Birds of New York. Vol. II. 4to. Memoir 12, New York State Museum, Albany, N. Y., 1914. Price $3.

Field Museum of Natural History. Annual Report of the Director for the Year 1913.

Gabrielson, Ira N. (1) Ten Days' Bird Study in a Nebraska Swamp. (Wilson Bull., June, 1914, pp. 51–68.) (2) Breeding Birds of a Clay County, Iowa, Farm. (Wilson Bull., June, 1914, pp. 69–80.)

Grinnell, Joseph. A New Red-winged Blackbird from the Great Basin. (Proc. Biol. Soc. Wash., XXVII, pp. 107–108, May 11, 1914.)

Hartford [Conn.] Bird Study Club. Year Book, 1914–1915.

Kalmbach, E. R. Birds in Relation to the Alfalfa Weevil. (Bull. 107, U. S. Dept. Agr., July 27, 1914.)

McAtee, W. L. Five Important Wild-Duck Foods. (Bull. 58, U. S. Dept. Agr., February 7, 1914.)

Mathews, Gregory M. The Birds of Australia. Vol. III, Part 6. 4°. London. June 25, 1914.

Nature Library. The New thin paper edition. Vols. I–VIII. Doubleday, Page & Co. New York. 1914.

Pennsylvania Game Commissioners for 1913.

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NOTES AND NEWS.

ECTOPISTES MIGRATORIUS, once one of the most notable species in the North American avifauna became extinct on September 1, by the death of the last surviving specimen, a female, which had lived for twenty-nine years in the aviary of the Cincinnati Zoölogical Garden. It is rarely possible to state the exact date of the extinction of a species as the process is usually a gradual one, but in view of the fruitless efforts extending over the past ten years to find evidence of the existence of wild Passenger Pigeons we may safely consider the passing of this last captive specimen as the extinction of the species.

The reduction of this once abundant bird to absolute extermination by man's greed should be a lesson to us all and should stifle all opposition to the efforts now being made by national and state governments in behalf of the conservation of other birds threatened with a like fate. What is a little loss of sport to us compared with the extinction of a wild bird species — something that the hand of man can never replace?

As we glance over the pages of 'The Nuttall Bulletin' and 'The Auk' we fail to find a satisfactory chronological record of the extermination of this splendid bird. That it had decreased materially was recognized and also that the great flights that darkened the sky were a thing of the past in most parts of the country. Writers were busy explaining why the birds had left their immediate vicinity and speculating as to where they had gone,

little dreaming that the disappearance was general and that the supposed 'migration' was really extermination. In many a local list the Passenger Pigeon is mentioned and dates given which constituted the last record of the bird for that state or county, although the writers little thought when they penned the lines of their import in years to come.

The pigeon trappers year after year plied their nefarious trade, and with the assistance of game dealers warded off legislation that might have checked the slaughter, although there was really little effort made in behalf of the birds as the public failed to appreciate what was going on, and the sentiment for the conservation of wild life was not yet aroused.

Prof. H. B. Roney and others associated with him stand out as the few who did realize the approaching catastrophe but his account of the butchery of the last great nesting at Petosky, Michigan, in 1878, came too late.

The bird was not exterminated at this time and Mr. William Brewster who went to Michigan in 1888 in the hope of seeing another nesting wrote: "that the Pigeon is not, as has been asserted so often recently, on the verge of extinction, is shown by the flight which passed through Michigan in the spring of 1888.... and the birds must have formed a nesting of considerable extent in some region so remote that no news of its presence reached the ears of the vigilant netters." (Auk, 1889, p. 290.)

Nevertheless it seems as if the slaughter of 1878 and years immediately following had done its work; apparently the birds had been so reduced that another great nesting was impossible. The pigeon like the buffalo was a species whose existence seems to have depended upon association in large numbers and once separated and scattered into small flocks and pairs its doom was sealed.

Later mention in 'The Auk' consists of early records hitherto unpublished, because their significance was not appreciated until the imminence of extermination was forced upon our attention. Finally we have the numerous recent records of "birds seen" mainly by people who never saw live Passenger Pigeons in the time of their abundance and then the rewards for the detection of live birds under the direction of Prof. Hodge lasting over three years which were productive of negative evidence only.

The Cincinnati bird was sent to the United States National Museum to be mounted and placed on exhibition and we learn from Dr. Charles W. Richmond, acting curator of birds, that it was photographed and then entrusted to Mr. William Palmer and Dr. R. W. Shufeldt, the former of whom was to skin it while the latter was to make a study of its anatomy and preserve such of the soft parts as possible. We hope to publish the results of Dr. Shufeldt's investigations in the January number of 'The Auk.'

In an interesting article in the July–August number of 'Bird-Lore' Mr. Leo E. Miller, a member of the Roosevelt Brazilian expedition, presents some facts regarding the exportation of feathers from Argentina to the United States.

In one place he saw piles of burlap-covered bales filled with Rhea feathers aggregating sixty tons in weight, all the feathers having been taken from wild killed birds.

These are the feathers used so extensively for feather dusters and lately for millinery purposes also. Further inquiry elicited the fact that thirty-four tons of these same feathers had been exported during the first six months of the last fiscal year.

The provision of the new tariff prohibiting the importation of wild bird plumage will fortunately deal a death blow to this traffic.

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ERRATA.

Page 105, line 8, for *Arenaria morinella* read *A. interpres morinella*.
" 105, " 35, for *pacifica* read *sakhalina*.
" 140, " 32, for Osborne read Osborn.
" 248, " 43, for *Corvus brachyrhynchos* read *Corvus brachyrhynchos brachyrhynchos*.
" 279, " 35, for *Eremonula* read *Eremomela*.
" 314, line 25, for **Oxyechus vociferus vociferus** read **O. vociferus.**
" 322, " 40, for **Spinus pinus pinus** read **S. pinus.**
" 402, " 20, for *Polioptila cærulea* read *P. cærulea cærulea*.
" 407, " 13, for *scularis* read *scalaris*.
" 408, " 13, for *emeraldæ* read *esmeraldæ*.
" 412, " 35, for *Loukouchai* read Loukouchai.
" 426, " 36, for *Edolisoma* read *Edoliisoma*.
" 428, " 21, for *Magillivrayornis* read *Macgillivrayornis*.
" x, " 29, omit Prof. Theodore N. Gill.
" xi, lines 3, 4, 9, for 1914 read 1913.
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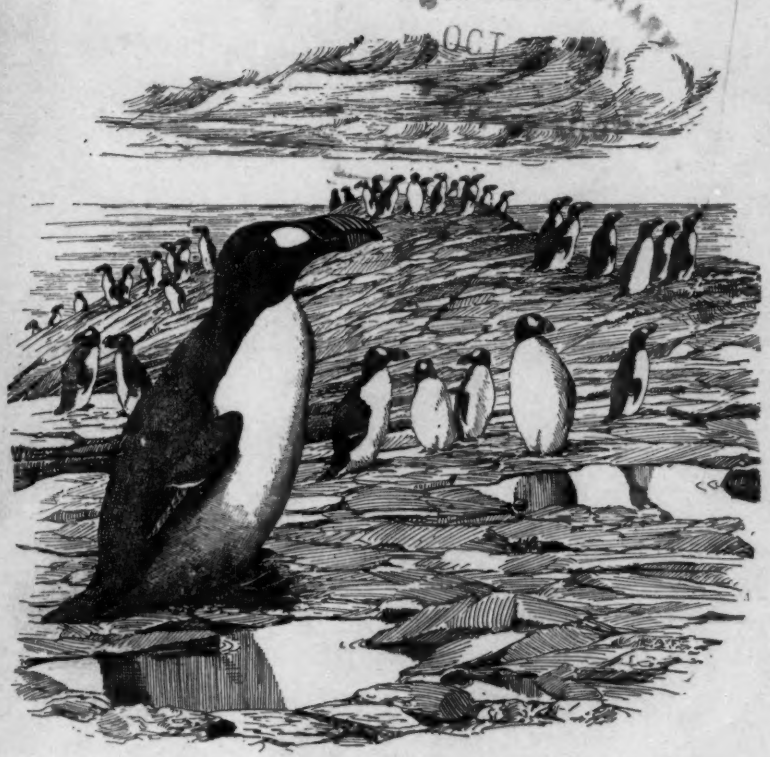

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